

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MATSUTANI SEISAKUSHO CO LTD

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(72)Inventor : FUKUDA MASATOSHI

ISAKI HARUO

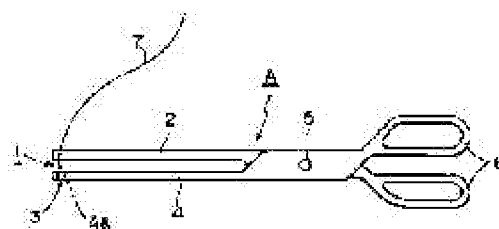
MATSUTANI KANJI

## (54) MEDICAL SUTURE INSERTING TOOL AND NEEDLE WITH SUTURE USED FOR IT

### (57)Abstract:

PURPOSE: To insert a suture between or into the tissues of a living body with a one-step action for ligation or suture.

CONSTITUTION: A needle-shaped body serving as a passing means holding a suture 7 is fitted to the fitting section of a fitting member 2 serving as the first driving means. A receiving means receiving a suture 7 directly or via a needle-shaped body is fitted to the hole 4a of a holding member 4 serving as the second driving means. The fitting member 2 and the holding member 4 are rotatably fitted to a shaft 5 to constitute a suture inserting tool A. The fitting member 2 and the holding member 4 are operated to drive the needle-shaped body, and the needle-shaped body is inserted between or into tissues and coupled with the receiving means of the holding member 4. The receiving means applies pressing force to the coupled needle-shaped body or the suture 7 to hold it. When the fitting member 2 is separated from the holding member 4, the suture 7 or the needle-shaped body is held by the receiving means and removed from the fitting member 2, and it is inserted between or into tissues. The suture 7 is extended in the axial direction from the root end face of a needle holding a suture, and the needle is formed into a straight shape having a prescribed length.



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**CLAIMS**

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[Claim(s)]

[Claim 1]A medical-application threader implement by which it was characterized, comprising:

A passage means to hold thread and to pass between organizations or an in-house.

A receiving means which receives thread held at a passage means or a passage means which between organizations or an in-house was passed.

[Claim 2]A passage means to hold thread and to pass between organizations or an in-house, and the 1st driving means that drives said passage means and passes between organizations or an in-house, A medical-application threader implement having a receiving means which receives substantially thread which passed between organizations or an in-house, and the 2nd driving means that drives said receiving means, having made said passage means and a receiving means counter, and having arranged.

[Claim 3]A medical-application threader implement indicated to claim 2 constituting a final controlling element which it attaches to an axis on which said 1st driving means and the 2nd driving means are common in the 1st driving means and the 2nd driving means, such as this, by consisting of a member of lever shape rotatable, and gives power to the end side.

[Claim 4]A medical-application threader implement indicated to claim 2 having a thread attaching part which said passage means is arranged so that a tip may project from this 1st driving means in the receiving means side to said 1st driving means, and holds thread near the tip, or 3.

[Claim 5]A medical-application threader implement indicated to claim 4 having a hooking part which hooks and receives this thread when said receiving means counters a tip part with thread.

[Claim 6]Said passage means so that a tip may project from this 1st driving means in the receiving means side to said 1st driving means. A medical-application threader implement indicated they to be [ any of claims 2 thru/or 4 having a suspending portion which stops a larger portion than other portions formed in thread formed at a slot or a hole which inserts in thread which has been arranged and was formed along with an axial center of a longitudinal direction, and a tip ].

[Claim 7]A medical-application threader implement indicated they to be [ claims 2 thru/or 4 or any of 6 ]. [ being what receives thread in connection with making elastic force act on thread held at a tip of a passage means by which said receiving means fitted into this receiving means, holding, and a passage means seceding from a receiving means ]

[Claim 8]A medical-application threader implement indicated to claim 2 having a thread holding part which is arranged so that it may be equipped with said passage means removable to said 1st driving means and a tip may project in the receiving means side from this 1st driving means, and fixes thread to the back end, or 3.

[Claim 9]A medical-application threader implement indicated to claim 8, wherein said passage means consists of a magnetic body or a magnet.

[Claim 10]A medical-application threader implement indicated they to be [ claims 2, 3, and 8 or any of 9 ]. [ being what make elastic force act on a passage means by which said receiving means fitted into this receiving means, hold, and a passage means is made to secede from the 1st driving means with operation of the 1st driving means and the 2nd driving means, and is received ]

[Claim 11]A medical-application threader implement indicated to claim 9 said receiving means's consisting of a magnet or a magnetic body, making adsorption power act on a passage means which fitted in, holding,

and receiving thread substantially.

[Claim 12]A medical-application threader implement indicated they to be [ any of claims 2, 3, 5, 7, 10, and 11 having provided an attaching part in said 2nd driving means and attaching said receiving means to this attaching part removable ].

[Claim 13]it is an atraumatic needle used as a passage means indicated to claim 8, and had predetermined length -- it being formed direct needlelike, and thread from the former end face to shaft orientations, [ install and ] And an atraumatic needle which shape in a position which carried out prescribed distance from the former end face and this former end face spreads shape of a fitting part, abbreviation, etc. which were formed in the 1st driving means, and was characterized by forming a size small slightly.

[Claim 14]The atraumatic needle according to claim 13 having formed a tip part of said atraumatic needle in tapered shape, and forming a slot in a position which carried out prescribed distance over the perimeter from a tip.

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[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the atraumatic needle used for the threader implement and this threader implement of the medical application used when performing the suture of the ligation in a narrow part or a deep part, or an incision part.

[0002]

[Description of the Prior Art]Litigating with thread the blood vessel in the circumference of the affected part which should be extracted on the occasion of a surgical operation, and suturing an incision part with thread is performed. Ligation of a blood vessel or the suture of an incision part is performed by pulling out and connecting the thread which passed between organizations or under the organization for thread by grasping the needle holder or a ligature inductor and operating the suture needle furnished with thread, and passed through the organization to the operating person side.

[0003]When carrying out the above-mentioned ligation and a suture, after an operating person has the needle holder in one hand and passes between organizations or an in-house for a suture needle, he will perform operation which has the needle holder again and samples a suture needle. For this reason, when the part which should be ligated, or the part which should be sutured is one of a living body's deep parts, operation by an operating person is difficult and development of the ligation implement and stitching tool which can be carried out promptly and certainly single hand is demanded.

[0004]For example, the suture instrument indicated by JP,5-11859,Y meets the above-mentioned demand. By operating single hand the handle and trigger which are the manual-operation parts of forceps, the suture needle formed in the tip part is operated, and it constitutes so that an operation part can be ligated or sutured.

[0005]On the other hand, by the latest operation, since making an incision part small and making a scar small as much as possible is performed, ligation and suture work are done by an increasingly narrow part.

[0006]

[Problem(s) to be Solved by the Invention]When ligating a blood vessel using the above-mentioned suture instrument, it is required that two steps of operations of the gripping operation of thread accompanying the suture operation and trigger operation by the suture needle accompanying handle operation should be performed. For this reason, when ligating by a very narrow part, complicatedness of operation cannot be wiped away, but development of the instrument which can be ligated by easier operation is desired.

[0007]The purpose of this invention is to provide the atraumatic needle used the best for the medical-application threader implement and this threader implement which can perform ligation of a blood vessel, or the suture of an incision part by operation of a single step.

[0008]

[Means for Solving the Problem]A fundamental medical-application threader implement which starts this invention in order to solve an aforementioned problem has a receiving means which receives thread held at a passage means to hold thread and to pass between organizations or an in-house, and a passage means or a passage means which between organizations or an in-house was passed, and is constituted.

[0009]A passage means for a typical threader implement to hold thread and to pass between organizations or an in-house, It has the 1st driving means that drives said passage means and passes between

organizations or an in-house, a receiving means which receives substantially thread which passed between organizations or an in-house, and the 2nd driving means that drives said receiving means, and said passage means and a receiving means are made to counter, and it is arranged and constituted.

[0010]In the above-mentioned threader implement, it attaches to an axis on which the 1st driving means and the 2nd driving means are common in the 1st driving means and the 2nd driving means, such as this, by consisting of a member of lever shape rotatable, and it is preferred to constitute a final controlling element which gives power to the end side.

[0011]It has a suspending portion which stops a portion with a larger passage means than other portions formed in thread formed at a slot or a hole which inserts in thread which has been arranged so that a tip may project from this 1st driving means in the receiving means side to the 1st driving means, and was formed along with an axial center of a longitudinal direction, and a tip, It is preferred that it is what receives thread in connection with making elastic force act on thread held at a tip of a passage means by which a receiving means fitted into this receiving means, holding, and a passage means seceding from a receiving means.

[0012]It has a thread holding part which is arranged so that it may be equipped with a passage means removable to the 1st driving means and a tip may project in the receiving means side from this 1st driving means, and fixes thread to the back end, It is preferred that a receiving means is what makes elastic force act on a passage means which fitted into this receiving means, holds, makes a passage means secede from the 1st driving means, and receives it with operation of the 1st driving means and the 2nd driving means.

[0013]An atraumatic needle concerning this invention spreads shape of a fitting part where shape in a position with predetermined length which it was formed direct needlelike, installed thread in shaft orientations from the former end face, and carried out prescribed distance from the former end face and this former end face was formed in the 1st driving means, abbreviation, etc., and a size is formed small slightly.

[0014]

[Function]In the above-mentioned medical-application threader implement (henceforth a "threader implement"). By passing between organizations or an in-house for the thread held by the passage means, since the passage means and the receiving means were made to counter and it has arranged, and making the holding portion of thread fit into a receiving means, and making a passage means isolate from a receiving means after that. The thread which passed between organizations or an in-house is received by a receiving means. Therefore, it can litigate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0015]When a passage means is driven for a threader implement by the 1st driving means, and it constitutes so that a receiving means may be driven by the 2nd driving means, Between organizations or an in-house is passed for thread, and the thread which passed between organizations or an in-house is receivable by a receiving means because operate the 1st and 2nd driving means single hand, and an operating person approaches and makes a passage means and a receiving means isolate. Therefore, it can litigate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0016]Since the 1st and 2nd driving means was formed in lever shape, and it equipped rotatable centering on each means, such as this, and the final controlling element was provided in the end, the operating person can operate a threader implement at the feel same with operating forceps. For this reason, sense of incongruity cannot be made to be able to become attached to an operating person, and easy positive ligation or suture can be performed.

[0017]A passage means is arranged so that a tip may project in the receiving means side from the 1st driving means, The suspending portion which stops a larger portion than other portions which the slot or hole which inserts in thread along with the axial center of a longitudinal direction was formed, and were formed at the tip at thread is formed, And since it constituted so that elastic force might be made to act on the thread held in the receiving means at the tip of the passage means which fitted into this receiving means and it could hold, a passage means fits into a receiving means.

Then, in connection with a passage means seceding from a receiving means, thread is receivable.

[0018]It is arranged so that it may be equipped with a passage means removable to the 1st driving means

and a tip may project in the receiving means side from this 1st driving means, And since it constituted so that a thread holding part might be formed in the back end of a passage means, thread might be fixed to this holding part, elastic force might be made to act on the passage means by which the receiving means fitted into this receiving means further and it could hold, a passage means fits into a receiving means. Then, in connection with the 1st and 2nd driving means being isolated, it is receivable by making a passage means secede from the 1st driving means.

[0019]The atraumatic needle concerning this invention inserts thread in the blind hole with predetermined length which it was formed direct needlelike and formed in the former end face, and is made to unify it by a caulking or adhesion, And the shape in the position which carried out prescribed distance from the former end face and this former end face spreads shape of a fitting part, abbreviation, etc. which were formed in the 1st driving means, and since the size formed small slightly, It can equip removable to the 1st driving means, the driving force accompanying operation of the 1st driving means is transmitted to the former end face, and between organizations or an in-house can be passed. When it fits into a receiving means, it can secede from the 1st driving means easily with isolation of the 1st and 2nd driving means.

[0020]

[Example]The example of the above-mentioned threader implement is described using figures below. The side view explaining the entire configuration of the threader implement constituted so that drawing 1 might rotate a carrying member and an attachment component focusing on an axis and disjunction of a passage means and the receiving means might be carried out, The figure explaining the important section of the threader implement concerning the 1st example constituted so that drawing 2 might hook and receive thread, The figure explaining the composition of the passage means and receiving means which drawing 3 requires for the 2nd example, the figure with which drawing 4 explains other composition of a passage means, The figure explaining the important section of the threader implement which requires drawing 5 for the 3rd example that constituted the passage means removable to the carrying member, The figure with which drawing 6 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 7 explains a ligation operational sequence, the figure explaining the important section of the threader implement which drawing 8 requires for the 4th example that constituted the passage means removable to the carrying member, The figure explaining the important section of the threader implement which requires drawing 9 for the 5th example that constituted the passage means removable to the carrying member, The figure with which drawing 10 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 11 explains the application of the 5th example, the figure with which drawing 12 explains other examples of composition of a receiving means, The figure with which drawing 13 explains the example of composition of further others of a receiving means, the figure with which drawing 14 explains the composition of an atraumatic needle, the side view explaining the entire configuration of the threader implement which drawing 15 gave spring nature and to which it connected the carrying member and the attachment component, They are a side view explaining the entire configuration of the threader implement with which drawing 16 formed the tip end part of the carrying member circularly, and a side view explaining the entire configuration of the threader implement which enabled it for drawing 17 to litigate a deep part easily, or to suture it.

[0021]The threader implement concerning this invention makes it possible to be that an operating person operates a single step and pulls out single hand, to pass between the organizations around a blood vessel, to litigate thread, when suturing ligation or the incision part of a blood vessel, or to pass the in-house of an incision part, to suture, and to pull out thread outside of the body. For this reason, it is possible to litigate and suture promptly and easily the blood vessel and incision part in a living body's deep part and narrow part. Although the case where a blood vessel is mainly litigated below is explained, even if it is a case where an incision part is sutured, it is possible to carry out by same operation substantially.

[0022]The threader implement A shown in drawing 1 attaches the passage means 1 to the carrying member 2 used as the 1st driving means formed in lever shape, and. The receiving means 3 is attached to the attachment component 4 used as the 2nd driving means formed in lever shape, the carrying member 2 and the attachment components 4, such as this, are attached to the axis 5 rotatable, and it is constituted. The handle 6 which serves as a final controlling element, respectively is formed in one side (right-hand side in

drawing 1) rather than the axis 5 of the carrying member 2 and the attachment component 4, and it is constituted so that an operating person may be able to operate it at the same feel as forceps.

[0023]The passage means 1 is attached to the carrying member 2 where the thread 7 is held, it passes between a living body's organizations or an in-house with grasping operation of the threader implement A, and turns the surroundings of the blood vessel which should pass between organizations or an in-house and should litigate the thread 7 by this.

[0024]In this invention, it is possible to form the passage means 1 at the tip (left-hand side in drawing 1) of the carrying member 2 in one. However, when very minute slit and slot for holding the thread 7 for the passage means 1 may be formed and the sterilization treatment after an operation is taken into consideration, the sterilization treatment to said slit or a slot may become difficult. For this reason, it constitutes so that the passage means 1 can be detached and attached to the carrying member 2, and as for after the operation, it is preferred to lay on the shelf.

[0025]The passage means 1 passes through between the organizations in the circumference of the blood vessel which should hold and litigate the thread 7, or passes the in-house in an incision part. For this reason, the shape and composition of the passage means 1 can take various gestalten so that it may mention later, and it is preferred to adopt what was most suitable corresponding to the contents and the purpose of an operation.

[0026]The receiving means 3 receives the thread 7 substantially by receiving a direct receipt or the passage means 1 for the thread 7 which passed between organizations or an in-house and was turned to the surroundings of the blood vessel with the passage means 1 directly. For this reason, the shape and composition of the receiving means 3 can take various gestalten corresponding to the shape and composition of the passage means 1 so that it may mention later. That is, with selection of the passage means 1, it is constituted so that the optimal receiving means 3 can be adopted.

[0027]When, as for the desirable gestalt of the receiving means 3, the passage means 1 fits into the receiving means 3 by grasping operation of the threader implement A, When thrust is made to act on this passage means 1 and the passage means 1 secedes from a receiving means by the opening operation of the threader implement A, the thread 7 is received via the direct or passage means 1 by operation of said thrust.

[0028]For this reason, the elastic body which fabricated rubbers containing urethane rubber without a possibility of the receiving means 3 having moderate elasticity, and having an adverse effect on a living body, and silicone rubber, such as a synthetic rubber or crude rubber, It is constituted by giving elasticity to the attachment component itself by performing slit processing etc. to the elastic body which fabricated materials which have spring nature, such as a stainless plate and a phosphor bronze board, or the attachment component 4. When the passage means 1 is formed with a magnetic body or a magnet, it is also possible to constitute the receiving means 3 with a magnet or a magnetic body.

[0029]When rubber, a metal plate, a magnet, a magnetic body, etc. constitute the receiving means 3 like the above, the receiving means 3 is in the state which fitted into the hole 4a formed at the tip of the attachment component 4, or is held in the state where it pasted up with adhesives. For this reason, there is a possibility that a very minute opening may be formed between the receiving means 3 and the hole 4a, and there is a possibility that it may become difficult to perform perfect sterilization treatment after the operation. Therefore, the receiving means 3 is constituted removable to the attachment component 4, and, as for after an operation, it is preferred to lay on the shelf of this receiving means 3.

[0030]When slit processing and the special mechanism as opposed to the attachment component 4 for the receiving means 3 are incorporated and constituted, it becomes indispensable to fully carry out sterilization treatment of this machining part or the working part.

[0031]Hereafter, a concrete example is described separately.

[0032]As shown in drawing 2, when the passage means 11 counters the receiving means 3 by the carrying member 2 and attachment component 4 grasping operation, the threader implement A concerning the 1st example is constituted so that the thread 7 held at the tip part of this passage means 11 may be hooked and it may receive directly.

[0033]In the figure, the passage means 11 adheres at the tip of the carrying member 2, and is constituted in one. The tip of the passage means 11 is formed in flat state, as shown in the Drawing (a) and (b), the central projection 11a with high height is formed in the crosswise center, and the shoulder projection 11b is

formed in the both sides of this projection 11a. Between the central projection 11a and the shoulder projection 11b, the slit 11c is formed, respectively, and 11 d of slots are formed in the central projection 11a along shaft orientations.

[0034]The slit 11c is formed with the size according to the thickness of the thread 7. That is, the slit 11c is formed with the size slightly narrower than the thickness of the thread 7. And as shown in the figure (c), it comprises making the thread 7 which is the circumference of the central projection 11a and was turned to the slot 11d side engage with the slit 11c so that the thread 7 can be held by collaboration with the central projection 11a and the shoulder projection 11b.

[0035]The rod-like structure 8 which countered the attachment component 4 with said 11 d of slots, and formed the hook-like hooking part 8a at the tip is attached.

[0036]If the handle 6 is grasped and the carrying member 2 and the attachment component 4 are made to approach in the threader implement A constituted like the above, If between organizations or an in-house is passed where the thread 7 is held, and the hooking part 8a of the rod-like structure 8 counters 11 d of slots of the passage means 11, the passage means 11, It is possible to maintain and receive the state where this hooking part 8a hooked the thread 7, and was engaged, and the thread 7 engaged with the hooking part 8a with isolation with the carrying member 2 and the attachment component 4 further.

[0037]Next, the threader implement A which starts the 2nd example by drawing 2 is explained. In this example, as the passage means 1, the same thing as the passage means 11 in the 1st example is used, and concrete explanation is omitted. However, 11 d of slots formed in the central projection 11a are unnecessary.

[0038]The receiving means 31 counters with the passage means 11, and is arranged. The slit 31a corresponding to the flat shape of the passage means 11 is formed in this receiving means 31 so that the flat state passage means 11 can fit in easily. The field which counters the passage means 11 of the receiving means 31 is formed as the inclined plane 31b sloping from the circumference side towards the slit 31a, in order to introduce the passage means 11 into the slit 31a.

[0039]The crevice 31c is formed in the opposite hand of the passage means 11 of the receiving means 31, and the press piece 31d is formed of the inclined plane 31b and the crevice 31c. Therefore, by setting up the depth of the crevice 31c suitably, it is possible to set up the thickness of the press piece 31d, and it is possible to set up the thrust which acts on the passage means 11 which fitted in by setting up suitably the thickness which is the press piece 31d.

[0040]In the threader implement A which attached the passage means 11 constituted like the above, and the receiving means 31. Hold this thread 7 by the passage means 11, insert in the affected part in this state, carry out grasping operation of the threader implement A, the passage means 11 and the receiving means 31 are made to approach relatively, and the passage means 11 is made to fit into the receiving means 31 by making the thread 7 engage with the slit 11c formed in the passage means 11 beforehand. By this grasping operation, the thread 7 is turned to the surroundings of the blood vessel which should be ligated, and the thrust by the receiving means 31 acts on the thread 7.

[0041]Subsequently, if opening operation of the threader implement A is carried out and the passage means 11 and the receiving means 31 are made to isolate, the passage means 11 will secede from the receiving means 31. At this time, by the thrust by the press piece 31d of the receiving means 31, the thread 7 secedes from the slit 11c of the passage means 11, and is pinched by the press piece 31d. That is, the thread 7 is received by the receiving means 31. Then, if the threader implement A is pulled out outside of the body, the thread 7 will maintain the state where it was pinched by the press piece 31d of the receiving means 31, and will be pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 secede from the receiving means 31 easily by pulling the thread 7.

[0042]Like the above, when an operating person operates the single step of only grasping, opening and closing the handle 6 of the threader implement A, it is possible to turn the surroundings of a blood vessel and to receive the thread 7 held at the passage means 11 by the receiving means 31.

[0043]It is possible to use what formed the slot 11e which stops and holds the thread 7 at the tip, the thing in which 11 f of holes held through the thread 7 near the tip were formed, etc., as passage means 11 other than the above, as shown in drawing 4.

[0044]When the passage means 11 like the above is used, it is possible to use selectively the receiving



means 31 which has the rod-like structure 8 or elasticity in which the hooking part 8a in the 1st example was formed as the receiving means 3.

[0045]Next, the threader implement A which starts the 3rd example by drawing 5 is explained.

[0046]The passage means is constituted in this example by the length set up beforehand and the cylindrical style 12 which has thickness, The blind hole which spherical or is not illustrated in the former end face 12b which it is formed in the shape of \*\*, and is a rear end face is formed so that the tip 12a may pass easily between a living body's organizations or an in-house. And by inserting the end of the thread 7 in said blind hole, and closing the circumference of this blind hole, the thread 7 is held at the style 12. It is preferred to use the atraumatic needle 12 mentioned later as said style 12.

[0047]The fitting part 2a which attaches the style 12 removable is formed at the tip of the carrying member 2 of the threader implement A. The fitting part 2a has the function to hold the attached style 12 temporarily. That is, the style 12 fits into the receiving means 32 with grasping operation of the carrying member 2 and the attachment component 4.

Then, in connection with the opening operation of each of said members 2 and 4, the style 12 secedes from the fitting part 2a, and is received by the receiving means 32.

[0048]the fitting part 2a which holds the style 12 temporarily is shown in drawing 6 — as — the prescribed position by the side of the tip of the carrying member 2 — the outer diameter of the style 12, and abbreviation — the crevice 2a with an equal path is formed, and this crevice 2a and a tip are connected with slit 2b, and it is constituted.

[0049]Therefore, the thread 7 which attached eye \*\* is inserted in via slit 2b, and it is possible to attach the style 12 to the carrying member 2 by making the former end face 12b side of the style 12 fit into the crevice 2a which is the fitting part 2a. The style 12 attached in this way holds the state where it fitted into the crevice 2a, and it does not secede from it simply.

[0050]The resistance which generates the style 12 when passing between organizations or an in-house is transmitted to the carrying member 2 via the contact surface of the former end face 12b of the style 12, and the crevice 2a. Therefore, when the style 12 passes through an organization, it does not secede from the carrying member 2 by pass resistance, or it does not fall.

[0051]The receiving means 32 presses and holds the periphery of this style 12, when the style 12 fits in with grasping operation of the threader implement A, By maintaining the pressing state over the style 12 and making it secede from the crevice 2a, when the carrying member 2 and the attachment component 4 are isolated in connection with the opening operation of the threader implement A, the thread 7 is received substantially.

[0052]for this reason — the center of the receiving means 32 — the outer diameter of the style 12, and abbreviation — it is equal, or the hole 32a with a slightly small path is formed, and the slideway 32b for showing this style 12 to the hole 32a is formed in the style 12 and the field which counters.

[0053]Next, drawing 7 explains like the above the case where the blood vessel E is ligated using the threader implement A which attached the style 12 and the receiving means 32.

[0054]As shown in the figure (a), it inserts in the inner part of the blood vessel E which should be ligated in the state which opened the threader implement A wide, i.e., the state where the style 12 and the receiving means 32 were made to isolate.

Then, the style 12 is made to fit into the receiving means 32, as grasping operation of the handle 6 is carried out and it is shown in the figure (b).

At this time, the style 12 is pressed by the receiving means 32 and held.

[0055]Subsequently, the style 12 secedes from the crevice 2a, and is held at the receiving means 32, and the thread 7 turns around the surroundings of the blood vessel E, and it means that it had been substantially received by the receiving means 32 via the style 12 as by carrying out opening operation of the threader implement A showed to the figure (c). In connection with the drawer to the outside of the body of the threader implement A, as shown in the figure (d), the thread 7 is also pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 and the style 12 secede from the receiving means 32 by pulling the thread 7.

[0056]It is possible like the above to adjust the holding power of the style 12 by the receiving means 32 by setting up the diameter and length of the hole 32a suitably in the style 12 and the receiving means 32

which were constituted. However, when making the style 12 secede from the receiving means 32, there is a possibility that comparatively big power may be required.

[0057]Next, the composition of the threader implement A which starts the 4th example by drawing 8 is explained.

[0058]The threader implement A concerning this example attaches to the carrying member 2 the style 13 which formed the spherule 13a at the tip removable, and it is a figure explaining the important section of the threader implement A which attached the receiving means 33 in which the spherical part 33a which accepts said spherule 13a was formed at the tip of the attachment component 4. It makes it possible to make the style 13 by which press holding was carried out to the receiving means 33 secede from this threader implement A easily by small power.

[0059]The spherule 13a with a larger path than the thickness of the style 13 is formed at the tip of the style 13, and the composition of those other than this spherule 13a is constituted like the style 12 mentioned above.

[0060]The spherical part 33a which accepts the spherule 13a is formed in the style 13 and opposite hand of the receiving means 33, and the slideway 33b which shows the spherule 13a to the spherical part 33a is formed in the style 13 and the field which counters. The hole 33c which connected the slideway 33b with the spherical part 33a, and had a slightly larger and path smaller than the path of the spherule 13a than the thickness of the style 13 is formed. Therefore, 33 d of projections are formed in accordance with the circumference of the hole 33c.

[0061]In the above-mentioned composition, the style 13 approaches the receiving means 33 with grasping operation of the threader implement A, and the spherule 13a fits into the spherical part 33a through the hole 33c. And if opening operation of the threader implement A is carried out, the carrying member 2 and the attachment component 4 are isolated with this operation, and the style 13 will secede from the crevice 2a, and will be held at the spherical part 33a of the receiving means 33.

[0062]If the thread 7 is pulled as it becomes parallel to the attachment component 4 as shown in drawing 8 (b) when pulling out the threader implement A outside of the body and making the style 13 secede from the receiving means 33, the base 13b of the spherule 13a will engage with 33 d of projections, and the style 13 will be rotated by making this engagement part into a fulcrum. With said rotation, the style 13 secedes from the receiving means 33 because the fulcrum and opposite hand of the spherical part 13a overcome 33 d of projections.

[0063]It is possible to make it very smaller than the power at the time of making the style 12 which mentioned above the power taken to apply the principle of a lever when making the style 13 secede from the receiving means 33 like the above to make the style 13 break away secede from the receiving means 32.

[0064]When ligating using the styles 12 and 13, whenever it carries out one ligation, it will be necessary for the threader implement A to attach the styles 12 and 13, and will lay on the shelf of the styles 12 and 13 for every one ligation.

[0065]Next, the composition of the threader implement A which starts the 5th example by drawing 9 is explained.

[0066]The position through implement A shown in a figure inserts in and holds the thread 7 to the shaft orientations of the style 14 attached to the carrying member 2, Make the style 14 fit into the receiving means 34 with grasping operation of the threader implement A, the style 14 is made to secede from the receiving means 34 in connection with the opening operation of the threader implement A, and it is a figure explaining the important section of the threader implement A constituted so that the thread 7 might be received by the receiving means 34.

[0067]The style 14 inserts in the thread 7 which has the larger diameter parts 7a, such as incidental looping which tied and formed the thread 7 in part, the conclusion ball or a ball which applied adhesives and was solidified, and a ball formed by fixing to thread the ball of the metal containing stainless steel, along shaft orientations, and. Stop and hold said larger diameter part 7a at a tip, and with grasping operation of the threader implement A, with the thread 7, pass between a living body's organizations or through under an organization, and it fits into the receiving means 34, And it is constituted so that it may be possible to receive the thread 7 by the receiving means 34, when seceding from the receiving means 34 in connection with the opening operation of the threader implement A.

[0068]In order to insert in the thread 7, the slit 14a with the size according to the thickness of this thread 7 is formed in the style 14 covering the overall length. The slit 14a is formed so that a pars basilaris ossis occipitalis may reach the center of the style 14, and in order to hold the larger diameter part 7a of the thread 7, the attaching part 14b of sphere form is formed at the tip of the style 14. The style 14 is attached to the fitting part 2a formed in the carrying member 2 removable.

[0069]The fitting part 2a which consists of the hole 2a with a path slightly smaller than the outer diameter of the style 14 as shown, for example in drawing 10 is formed at the tip of the carrying member 2. This hole 2a is wide opened with slit 2b at the tip side of the carrying member 2, and it is possible to insert the thread 7 in the slit 14a of the style 14 via slit 2b.

[0070]The oblong hole 2c where width is comparatively large is formed in the opposite hand of slit 2b of the hole 2a, this oblong hole 2c and hole 2a are connected, and the slit 2d is formed. That is, the two sandwiching pieces 2e in which the tip of the carrying member 2 had spring nature with the oblong hole 2c, the hole 2a, the slit 2d, and 2b are formed.

[0071]In the above-mentioned composition, since the hole 2a has a path smaller than the outer diameter of the style 14, when the style 14 is attached to the hole 2a, the style 14 is pressed with the sandwiching piece 2e, and is held firmly. The holding power over the style 14 by the sandwiching piece 2e can be set as a desired value by setting up suitably the ratio of the outer diameter of this style 14, and the path of the hole 2a, the length of the oblong hole 2c, etc. Therefore, when the style 14 passes between organizations or through under an organization, it does not secede from the hole 2a.

[0072]The hole 34a into which the tip end part of the style 14 is made to fit is formed in the center of the receiving means 34, and the slideway 34b which shows the hole 34a to the tip of this style 14 is formed in the style 14 and the field which counters. The crevice 34c is formed in the opposite hand of the receiving means 34.

[0073]The above-mentioned hole 34a is formed with the very small size (pinhole) so that it may be possible to press and receive the larger diameter part 7a of the thread 7. The portion into which the tip of the style 14 is made to fit does not necessarily need to be the hole 34a, and the piece cut deeply and formed in the shape of a single character, the shape of triradius, and cross shape from the slideway 34b of the receiving means 34 to the crevice 34c may constitute it.

[0074]When the style 14 fits into the receiving means 34, the thrust to the style 14 by the receiving means 34 needs to be smaller than the holding power of the style 14 by the sandwiching piece 2e of the carrying member 2. The thrust to the style 14 of the receiving means 34 can be adjusted with the depth of the material which constitutes the receiving means 34, and the crevice 34c. Therefore, the receiving means 34 is designed in consideration of said conditions.

[0075]In the above-mentioned composition, if the style 14 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the tip which the style 14 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 34. Subsequently, if opening operation of the threader implement A is carried out, the style 14 will secede from the receiving means 34 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the hole 34a of the receiving means 34. And it is possible to make it secede from the receiving means 34 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0076]When the above-mentioned style 14 is used, it is required to insert the thread 7 in the style 14 for every one ligation, but the style 14 can be used continuously. For this reason, when there are many ligation parts, what is necessary will be to exchange only the thread 7, and it is advantageous from a cost side.

[0077]Even if it is a case where such a style 14 is used, there is a possibility that an opening may be formed between the style 14 and the hole 2a which is the fitting parts 2a. For this reason, as for the style 14, since a possibility that said opening cannot be sterilized thoroughly arises when carrying out postoperative sterilization treatment, it is preferred to lay on the shelf for every one operation.

[0078]Drawing 11 is a figure explaining the important section of the threader implement A adapting the structure shown in the 5th above-mentioned example.

[0079]The slot 15a holding the thread 7 which has the larger diameter part 7a is formed at the tip of the style 15, and the slit 15b which shows the thread 7 to the operating person side along with the carrying

member 2 is formed in the back end. This needlelike end 15 is attached to the fitting part 2a which consists of the hole 2a formed at the tip of the carrying member 2 like the style 14 mentioned above removable.

[0080]The slit 35a into which the slot 15a formed at the tip of the style 15 is made to fit is formed in the center of the receiving means 35, and the slideway 35b which shows the slit 35a to the tip of this style 15 is formed in the style 15 and the field which counters. The crevice 35c is formed in the opposite hand of the receiving means 35.

[0081]In the above-mentioned composition, if the style 15 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the slot 15a which the style 15 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 35. Subsequently, if opening operation of the threader implement A is carried out, the style 15 will secede from the receiving means 35 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the slit 35a of the receiving means 35. And it is possible to make it secede from the receiving means 35 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0082]Next, drawing 12 explains the case where metal with spring nature constitutes the receiving means 3.

[0083]The metal plate which the receiving means 36 shown in the figure (a) had spring nature, or can demonstrate spring nature by heat treatment, For example, thickness abbreviation which consists of stainless steel Press forming of the 0.1-mm board is carried out, it is constituted, and it assumes receiving the style 12 with which it was equipped removable to the carrying member 2 as the passage means 1.

[0084]The flange 36a which was formed in the side which counters the receiving means 36 with the passage means 1 of the hole 4a of the attachment component 4 and which becomes depressed and fits into 4b, When the tip end part of the style 12 fits in, two or more slits 36c formed in the funnel shape receipt part 36b which presses this fitting part, and the receipt part 36b are formed, respectively.

[0085]The above-mentioned slit 36c is formed considering 36 d of skirts of the receipt part 36b as the starting point. For this reason, when the tip end part of the style 11 fits into the receipt part 36b, a possibility that 56 d of skirts may be expanded and thrust large enough cannot be acted arises. In order to solve this problem, the O ring shape member 36e which prevents 36 d of skirts of the receipt part 36b from being expanded is formed in the back side of the receipt part 36b.

[0086]When the tip end part of the style 11 fits into the receipt part 36b in the receiving means 36 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 36b. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 36, and secedes from the fitting part 2a of the carrying member 2.

[0087]The receiving means 37 shown in the figure (b) is constituted supposing receiving the style 12 like the above-mentioned receiving means 36. This receiving means 37 is formed by machining, for example, engine-lathe processing.

[0088]The flange 37a and the boss 37b are formed in the receiving means 37, and the boss 37b is in the hole 4a, abbreviation, etc. which were formed in the attachment component 4 by carrying out, and has a size. The hard drum-like receipt part 37c is formed succeeding the boss 37b, and 37 d of skirts of this receipt part 37c have a slightly larger size than the hole 4a. The tapered shape slideway 37e which is missing from the boss 37b from the flange 37a, and shows the tip of the style 12 in the direction of the receipt part 37c is formed, and two or more slits 37f are further formed in the receipt part 37c.

[0089]Therefore, it is possible to give spring nature to the receipt part 37c because 37 d of skirts are regulated by the hole 4a and transform the receiving means 37, when it fits into the hole 4a.

[0090]When the tip end part of the style 11 fits into the receipt part 37c in the receiving means 37 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 37c. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0091]Next, drawing 13 explains the composition of further others of the receiving means 3.

[0092]The receiving means 38 shown in a figure is constituted so that it may be possible to collaborate

with the hole 4a formed in the attachment component 4, and to receive the style 12, and thrust may be made to act on the style 12 which fitted into the hole 4a with the flat spring 38 built into the attachment component 4.

[0093]The metal plate in which the flat spring 38 had spring nature, for example, thickness abbreviation which consists of stainless steel, A 0.3-mm board is processed and it is constituted. It is constituted by the flat spring 38 by the press piece 38a which attends the hole 4a of the attachment component 4, and presses the style 12, and the suspension arm 38b provided in the prescribed position of the press piece 38a.

[0094]Near the hole 4a formed in the attachment component 4, the hollow 4c incorporating the flat spring 38 is formed.

The suspending portion 4d which stops the suspension arm 38b of the flat spring 38 is formed in the prescribed position of this hollow 4c.

The tapered shape slideway 4e is formed in the side which counters the style 12 of the hole 4a.

[0095]It is possible like the above to hold by the press piece 38a of the flat spring 38 giving thrust to the style 12 which fitted into the hole 4a in the constituted receiving means 38, and making the style 12 weld by pressure to the hole 4a. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0096]In the above-mentioned composition, it is preferred to provide the slot which engages with the press piece 38a of the flat spring 38 for the purpose of receiving the style 12 more certainly at the style 12. In this case, form the flat spring 38 in lever shape with a long overall length, and a pin is formed in the attachment component 4, Because energize so that a pin may be equipped with the flat spring 38 rotatable and the press piece 38a may always project inside the hole 4a, and make the end side of another side project from an attachment component and an operating person pushes this lobe. The press piece 38a is evacuated from the hole 4a, and it may constitute so that the style 12 may be made to secede from the hole 4a.

[0097]Next, drawing 14 explains the atraumatic needle which constitutes the style 12. The same numerals are given to the portion which has the style 12, identical parts, or the same function in the example of the following atraumatic needles.

[0098]The atraumatic needle 12 is formed in shape, such as spherical or the shape of \*\*, corresponding to the organization with predetermined length which should pass so that it may be formed direct needlelike and the tip 12a can run through between organizations or with an in-house smoothly. The thread 7 is installed in the shaft orientations of the atraumatic needle 12 from the former end face 12b. That is, a blind hole or a slot with the size corresponding to the specification of the thread 7 is formed in the former end face 12b of the atraumatic needle 12, and it is constituted so that the end of the thread 7 is inserted in this blind hole and a slot, it may caulking(refer to the figure (a) )-\*\*, or it may paste up (refer to the Drawing (b) and (c)) and the portion corresponding to a blind hole can be held. It is also possible to constitute the atraumatic needle 12 which carries out integral moulding of the thread 7 with insert molding method, and consists of synthetic resins so that it may mention later.

[0099]The sectional shape in particular of the drum section 12c of the atraumatic needle 12 is not limited. That is, since this atraumatic needle 12 is not grasped by the needle holder when undergoing an operation, it does not need to be the shape where grasping by the needle holder was assumed.

[0100]The former end 12d of the atraumatic needle 12 is temporarily held in the state where it fitted into the fitting part 2a formed in the carrying member 2. for this reason, the portion corresponding to [ are a portion which fits into the fitting part 2a at least, and ] the pars basilaris ossis occipitalis and edge of this fitting part 2a — the fitting part 2a and abbreviation — it is equal or it is required to be a slightly small size.

[0101]That is, as shown in the figure (a), when the slot 12e formed of the caulking is in agreement with the opening edge of the fitting part 2a, it is difficult to make the atraumatic needle 12 hold to the fitting part 2a in the state where it was stabilized.

[0102]When the fitting part 2a of the carrying member 2 is equipped with the atraumatic needle 12, the driving force with which the former end face 12b acts on the carrying member 2 in contact with the pars basilaris ossis occipitalis of the fitting part 2a is transmitted. For this reason, it is required for the former

end face 12b holding the thread 7 to have this thread 7 and a clear level difference.

[0103]The thickness of the thread 7 used when ligating a blood vessel is abbreviation. The thickness of the thread 7 which is 0.3 mm – about 0.4 mm, and is used when suturing an incision part is abbreviation. They are 0.2 mm – about 0.3 mm. When performing ligation or a suture, power required to pass between organizations or an in-house for the atraumatic needle 12 is about abbreviation 50g– 200g. When receiving the power of said extent in the former end face 12b, it is abbreviation to the circumference of the thread 7. The level difference (exposed surface of the former end face 12b) of about 0.1 mm should just be formed. For this reason, the thickness of the atraumatic needle 12 is set as about 0.8 mm – about 1 mm.

[0104]When equipping with the atraumatic needle 12 the threader implement A shown in drawing 1 and performing ligation or a suture, the tip 12a of the atraumatic needle 12 performs rotating motion according to the distance from the axis 5 to the fitting part 2a, and fits into the receiving means 3. For this reason, when the length of the atraumatic needle 12 is long, and the tip 12a fits into the receiving means 3, there is a possibility that the power of the direction which intersects the major axis of the atraumatic needle 12 may act, and smooth fitting cannot be made. For this reason, the overall length of the atraumatic needle 12 is set as the range of 3 mm – about 10 mm.

[0105]When using for the threader implement A which has the receiving means 3 constituted with the flat spring 38 in the atraumatic needle 12 as shown in drawing 13, 12 f of slots are formed in the position which carried out prescribed distance over the perimeter from the tip 12a of the atraumatic needle 12. 12 f of slots are because the press piece 38a of the flat spring 38 is engaged, by forming 12 f of this slot, can hold certainly the atraumatic needle 12 which fitted into the hole 4a of the attachment component 4, and can receive it.

[0106]Distance from the tip 12a to 12f of slots is not limited. However, as for 12 f of slots, it is preferred to be formed in the portion 12c which the portion linked to the both sides of 12 f of these slots is parallel, and is in the path of the hole 4a, abbreviation, etc. by carrying out, and has a size, for example, a drum section. In this case, it is not shaky, when the atraumatic needle 12 fits into the hole 4a and is held with the flat spring 38.

[0107]It is preferred to use SUS303 (stainless steel) or BSBM (free cutting brass) with a comparatively cheap price as a material at the time of constituting the atraumatic needle 12. It is possible by using such a material to reduce the cost of the atraumatic needle 12.

[0108]It is also possible to carry out the fabricating operation of the synthetic resin material, and to constitute the atraumatic needle 12. In this case, it is preferred to make it unify simultaneously with shaping of the atraumatic needle 12, and to install the thread 7 in the shaft orientations of the atraumatic needle 12 from the former end face 12b with insert molding method. The atraumatic needle 12 manufactured by this method can supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is possible to carry out discarding treatment of the atraumatic needle 12 after use easily.

[0109]Next, other composition of the attachment component 4 which attaches the carrying member 2 which attaches the passage means 1, and the receiving means 3 is explained.

[0110]Drawing 15 is a figure explaining the composition of the threader implement B which gave spring nature and connected the carrying member 2 and the attachment component 4. This threader implement B is constituted so that an operating person may be able to operate it at the same feel as tweezers.

[0111]The tip end part (left-hand side of drawing 15) of the carrying member 2 and the attachment component 4 is formed with moderate rigidity, and spring nature is given to a former portion (right-hand side of drawing 15), and the threader implement B is joined mutually. Even if it is the threader implement B constituted in this way, like each example mentioned above, make the passage means 11 unite with the carrying member 2, or the styles 12–14 are attached removable, and it is possible to attach the receiving means 31–38 to the attachment component 4, and to perform ligation of a blood vessel and the suture of an incision part.

[0112]Drawing 16 is a figure explaining the composition of the threader implement C which formed the tip of the carrying member 2 circularly. In the figure, the carrying member 2 and the attachment component 4 are attached to the axis 5 like the threader implement A, and are constituted rotatable mutually.

[0113]As for the attachment side of the passage means 1 in the carrying member 2, the linear shape straight part 2f which has the length beforehand set up from the axis 5 is formed, and the arc part 2g which

makes said length a radius is formed in the tip side which is this straight part 2f. And the passage means 1 is attached at the tip of the arc part 2g. The attachment side of the receiving means 3 in the attachment component 4 is installed by linear shape from the axis 5, and the receiving means 3 is attached to the length of the straight part 2f of the carrying member 2, and a corresponding position.

[0114]Like the above, in connection with the switching operation of the handle 6, the passage means 1 will move and carries out disjunction of the same circumference top to an abbreviated straight-line target in the constituted threader implement C to the receiving means 3 arranged on this circumference. For this reason, it becomes possible more correctly and to ensure receipt operation of the thread 7 by the receiving means 3.

[0115]That is, when the passage means 1 are the styles 12 and 13 attached to the carrying member 2 removable, in order that the styles 12 and 13 may fit in linearly to the receiving means 3 in connection with the switching operation of the threader implement C, power which becomes complicated to the styles 12 and 13 does not act. For this reason, it is possible to make the styles 12 and 13 fit into the receiving means 3 certainly.

[0116]Drawing 17 is a figure explaining the composition of the threader implement D which made it possible to perform the ligation and the suture in a very deep position, for example, the operation in the laparoscope. in the figure, the carrying member 2 and the attachment component 4 are arranged at the tip side of the casing 41 with predetermined length (responding to the part which should be ligated — abbreviation [ ] — 300 mm – 400 mm), and at least one members 2 and 4 are constituted so that disjunction can be carried out to the member of another side. In this example, the attachment component 4 is adhered at the tip of the casing 41, and it has attached to the axis which does not illustrate the carrying member 2 rotatable.

[0117]The casing 41 is attached to the operating grip 42 which formed the trigger 43, and the trigger 43 and the carrying member 2 are connected via conduction members which have been arranged inside the casing 41 and which are not illustrated, such as a wire or a rod. To constitute so that disjunction of the carrying member 2 and the attachment component 4 of each other can be carried out, it is required to connect the trigger 43, the carrying member 2, and the attachment component 4 by a conduction member.

[0118]Therefore, when an operating person operates the trigger 43, this operating physical force is transmitted to the carrying member 2 via a conduction member, and the thread 7 with which each member 2 approached the attachment component 4, and was held at the passage means 1 is received by the receiving means 3.

[0119]Like the above, it is preferred to form the casing 41 in the constituted threader implement E using the material which has flexibility, and it is desirable to form to such an extent that thickness can be inserted in an endoscope. By constituting the threader implement E from said conditions, it is possible to perform easily the ligation and the suture in the operation in the laparoscope carried out an endoscope supervising.

[0120]When ligating especially in the case of the operation in the laparoscope, what is called a medical-application clip is used now in many cases. However, when using a clip, there are problems, such as a point that shape is large, a point with a possibility that a clip may separate from a ligation part, and a point that a blood vessel must be made to exfoliate from the surrounding organization, but it becomes possible by using the above-mentioned threader implement E to avoid said each problem.

[0121]Although it is possible in each above-mentioned threader implement A–E to form each members forming with metallic materials, such as stainless steel, constituting with the mold goods of a synthetic resin is also possible. For example, when threader implement A–E is constituted from fabricating and assembling the carrying member 2, the attachment component 4, and the member of axis 5 grade with a synthetic resin, it is possible to supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is also possible to carry out discarding treatment of threader implement A–E after use easily.

[0122]

[Effect of the Invention]In the threader implement which starts this invention as explained to details above. It is possible to turn and ligate thread around a blood vessel by operation of the single step of opening and closing a threader implement, or to suture an incision part, and after ending said operation, thread can be pulled out outside of the body by pulling out a threader implement outside of the body. For this reason,

ligation operation and suturing operation can be performed certainly easily and promptly.

[0123]It has the feature of being able to raise the operativity of the above-mentioned threader implement more by using the atraumatic needle concerning this invention.

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[Translation done.]



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- 2.\*\*\*\* shows the word which can not be translated.
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**TECHNICAL FIELD**

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[Industrial Application]This invention relates to the atraumatic needle used for the threader implement and this threader implement of the medical application used when performing the suture of the ligation in a narrow part or a deep part, or an incision part.

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**PRIOR ART**

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[Description of the Prior Art]Litigating with thread the blood vessel in the circumference of the affected part which should be extracted on the occasion of a surgical operation, and suturing an incision part with thread is performed. Ligation of a blood vessel or the suture of an incision part is performed by pulling out and connecting the thread which passed between organizations or under the organization for thread by grasping the needle holder or a ligature inductor and operating the suture needle furnished with thread, and passed through the organization to the operating person side.

[0003]When carrying out the above-mentioned ligation and a suture, after an operating person has the needle holder in one hand and passes between organizations or an in-house for a suture needle, he will perform operation which has the needle holder again and samples a suture needle. For this reason, when the part which should be ligated, or the part which should be sutured is one of a living body's deep parts, operation by an operating person is difficult and development of the ligation implement and stitching tool which can be carried out promptly and certainly single hand is demanded.

[0004]For example, the suture instrument indicated by JP,5-11859,Y meets the above-mentioned demand. By operating single hand the handle and trigger which are the manual-operation parts of forceps, the suture needle formed in the tip part is operated, and it constitutes so that an operation part can be ligated or sutured.

[0005]On the other hand, by the latest operation, since making an incision part small and making a scar small as much as possible is performed, ligation and suture work are done by an increasingly narrow part.

[0006]

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**EFFECT OF THE INVENTION**

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[Effect of the Invention]In the threader implement which starts this invention as explained to details above. It is possible to turn and litigate thread around a blood vessel by operation of the single step of opening and closing a threader implement, or to suture an incision part, and after ending said operation, thread can be pulled out outside of the body by pulling out a threader implement outside of the body. For this reason, ligation operation and suturing operation can be performed certainly easily and promptly.

[0123]It has the feature of being able to raise the operativity of the above-mentioned threader implement more by using the atraumatic needle concerning this invention.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]When ligating a blood vessel using the above-mentioned suture instrument, it is required that two steps of operations of the gripping operation of thread accompanying the suture operation and trigger operation by the suture needle accompanying handle operation should be performed. For this reason, when ligating by a very narrow part, complicatedness of operation cannot be wiped away, but development of the instrument which can be ligated by easier operation is desired.

[0007]The purpose of this invention is to provide the atraumatic needle used the best for the medical-application threader implement and this threader implement which can perform ligation of a blood vessel, or the suture of an incision part by operation of a single step.

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**MEANS**

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[Means for Solving the Problem]A fundamental medical-application threader implement which starts this invention in order to solve an aforementioned problem has a receiving means which receives thread held at a passage means to hold thread and to pass between organizations or an in-house, and a passage means or a passage means which between organizations or an in-house was passed, and is constituted.

[0009]A passage means for a typical threader implement to hold thread and to pass between organizations or an in-house, It has the 1st driving means that drives said passage means and passes between organizations or an in-house, a receiving means which receives substantially thread which passed between organizations or an in-house, and the 2nd driving means that drives said receiving means, and said passage means and a receiving means are made to counter, and it is arranged and constituted.

[0010]In the above-mentioned threader implement, it attaches to an axis on which the 1st driving means and the 2nd driving means are common in the 1st driving means and the 2nd driving means, such as this, by consisting of a member of lever shape rotatable, and it is preferred to constitute a final controlling element which gives power to the end side.

[0011]It has a suspending portion which stops a portion with a larger passage means than other portions formed in thread formed at a slot or a hole which inserts in thread which has been arranged so that a tip may project from this 1st driving means in the receiving means side to the 1st driving means, and was formed along with an axial center of a longitudinal direction, and a tip, It is preferred that it is what receives thread in connection with making elastic force act on thread held at a tip of a passage means by which a receiving means fitted into this receiving means, holding, and a passage means seceding from a receiving means.

[0012]It has a thread holding part which is arranged so that it may be equipped with a passage means removable to the 1st driving means and a tip may project in the receiving means side from this 1st driving means, and fixes thread to the back end, It is preferred that a receiving means is what makes elastic force act on a passage means which fitted into this receiving means, holds, makes a passage means secede from the 1st driving means, and receives it with operation of the 1st driving means and the 2nd driving means.

[0013]An atraumatic needle concerning this invention spreads shape of a fitting part where shape in a position with predetermined length which it was formed direct needlelike, installed thread in shaft orientations from the former end face, and carried out prescribed distance from the former end face and this former end face was formed in the 1st driving means, abbreviation, etc., and a size is formed small slightly.

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[Translation done.]

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## OPERATION

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[Function]In the above-mentioned medical-application threader implement (henceforth a "threader implement"). By passing between organizations or an in-house for the thread held by the passage means, since the passage means and the receiving means were made to counter and it has arranged, and making the holding portion of thread fit into a receiving means, and making a passage means isolate from a receiving means after that. The thread which passed between organizations or an in-house is received by a receiving means. Therefore, it can litigate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0015]When a passage means is driven for a threader implement by the 1st driving means, and it constitutes so that a receiving means may be driven by the 2nd driving means, Between organizations or an in-house is passed for thread, and the thread which passed between organizations or an in-house is receivable by a receiving means because operate the 1st and 2nd driving means single hand, and an operating person approaches and makes a passage means and a receiving means isolate. Therefore, it can litigate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0016]Since the 1st and 2nd driving means was formed in lever shape, and it equipped rotatable centering on each means, such as this, and the final controlling element was provided in the end, the operating person can operate a threader implement at the feel same with operating forceps. For this reason, sense of incongruity cannot be made to be able to become attached to an operating person, and easy positive ligation or suture can be performed.

[0017]A passage means is arranged so that a tip may project in the receiving means side from the 1st driving means, The suspending portion which stops a larger portion than other portions which the slot or hole which inserts in thread along with the axial center of a longitudinal direction was formed, and were formed at the tip at thread is formed, And since it constituted so that elastic force might be made to act on the thread held in the receiving means at the tip of the passage means which fitted into this receiving means and it could hold, a passage means fits into a receiving means.

Then, in connection with a passage means seceding from a receiving means, thread is receivable.

[0018]It is arranged so that it may be equipped with a passage means removable to the 1st driving means and a tip may project in the receiving means side from this 1st driving means, And since it constituted so that a thread holding part might be formed in the back end of a passage means, thread might be fixed to this holding part, elastic force might be made to act on the passage means by which the receiving means fitted into this receiving means further and it could hold, a passage means fits into a receiving means. Then, in connection with the 1st and 2nd driving means being isolated, it is receivable by making a passage means secede from the 1st driving means.

[0019]The atraumatic needle concerning this invention inserts thread in the blind hole with predetermined length which it was formed direct needlelike and formed in the former end face, and is made to unify it by a caulking or adhesion, And the shape in the position which carried out prescribed distance from the former end face and this former end face spreads shape of a fitting part, abbreviation, etc. which were formed in the 1st driving means, and since the size formed small slightly, It can equip removable to the 1st driving means, the driving force accompanying operation of the 1st driving means is transmitted to the former end

face, and between organizations or an in-house can be passed. When it fits into a receiving means, it can secede from the 1st driving means easily with isolation of the 1st and 2nd driving means.

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[Translation done.]

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**EXAMPLE**

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[Example]The example of the above-mentioned threader implement is described using figures below. The side view explaining the entire configuration of the threader implement constituted so that drawing 1 might rotate a carrying member and an attachment component focusing on an axis and disjunction of a passage means and the receiving means might be carried out, The figure explaining the important section of the threader implement concerning the 1st example constituted so that drawing 2 might hook and receive thread, The figure explaining the composition of the passage means and receiving means which drawing 3 requires for the 2nd example, the figure with which drawing 4 explains other composition of a passage means, The figure explaining the important section of the threader implement which requires drawing 5 for the 3rd example that constituted the passage means removable to the carrying member, The figure with which drawing 6 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 7 explains a ligation operational sequence, the figure explaining the important section of the threader implement which drawing 8 requires for the 4th example that constituted the passage means removable to the carrying member, The figure explaining the important section of the threader implement which requires drawing 9 for the 5th example that constituted the passage means removable to the carrying member, The figure with which drawing 10 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 11 explains the application of the 5th example, the figure with which drawing 12 explains other examples of composition of a receiving means, The figure with which drawing 13 explains the example of composition of further others of a receiving means, the figure with which drawing 14 explains the composition of an atraumatic needle, the side view explaining the entire configuration of the threader implement which drawing 15 gave spring nature and to which it connected the carrying member and the attachment component, They are a side view explaining the entire configuration of the threader implement with which drawing 16 formed the tip end part of the carrying member circularly, and a side view explaining the entire configuration of the threader implement which enabled it for drawing 17 to litigate a deep part easily, or to suture it.

[0021]The threader implement concerning this invention makes it possible to be that an operating person operates a single step and pulls out single hand, to pass between the organizations around a blood vessel, to litigate thread, when suturing ligation or the incision part of a blood vessel, or to pass the in-house of an incision part, to suture, and to pull out thread outside of the body. For this reason, it is possible to litigate and suture promptly and easily the blood vessel and incision part in a living body's deep part and narrow part. Although the case where a blood vessel is mainly litigated below is explained, even if it is a case where an incision part is sutured, it is possible to carry out by same operation substantially.

[0022]The threader implement A shown in drawing 1 attaches the passage means 1 to the carrying member 2 used as the 1st driving means formed in lever shape, and. The receiving means 3 is attached to the attachment component 4 used as the 2nd driving means formed in lever shape, the carrying member 2 and the attachment components 4, such as this, are attached to the axis 5 rotatable, and it is constituted. The handle 6 which serves as a final controlling element, respectively is formed in one side (right-hand side in drawing 1) rather than the axis 5 of the carrying member 2 and the attachment component 4, and it is constituted so that an operating person may be able to operate it at the same feel as forceps.

[0023]The passage means 1 is attached to the carrying member 2 where the thread 7 is held, it passes between a living body's organizations or an in-house with grasping operation of the threader implement A,



and turns the surroundings of the blood vessel which should pass between organizations or an in-house and should litigate the thread 7 by this.

[0024]In this invention, it is possible to form the passage means 1 at the tip (left-hand side in drawing 1) of the carrying member 2 in one. However, when very minute slit and slot for holding the thread 7 for the passage means 1 may be formed and the sterilization treatment after an operation is taken into consideration, the sterilization treatment to said slit or a slot may become difficult. For this reason, it constitutes so that the passage means 1 can be detached and attached to the carrying member 2, and as for after the operation, it is preferred to lay on the shelf.

[0025]The passage means 1 passes through between the organizations in the circumference of the blood vessel which should hold and litigate the thread 7, or passes the in-house in an incision part. For this reason, the shape and composition of the passage means 1 can take various gestalten so that it may mention later, and it is preferred to adopt what was most suitable corresponding to the contents and the purpose of an operation.

[0026]The receiving means 3 receives the thread 7 substantially by receiving a direct receipt or the passage means 1 for the thread 7 which passed between organizations or an in-house and was turned to the surroundings of the blood vessel with the passage means 1 directly. For this reason, the shape and composition of the receiving means 3 can take various gestalten corresponding to the shape and composition of the passage means 1 so that it may mention later. That is, with selection of the passage means 1, it is constituted so that the optimal receiving means 3 can be adopted.

[0027]When, as for the desirable gestalt of the receiving means 3, the passage means 1 fits into the receiving means 3 by grasping operation of the threader implement A, When thrust is made to act on this passage means 1 and the passage means 1 secedes from a receiving means by the opening operation of the threader implement A, the thread 7 is received via the direct or passage means 1 by operation of said thrust.

[0028]For this reason, the elastic body which fabricated rubbers containing urethane rubber without a possibility of the receiving means 3 having moderate elasticity, and having an adverse effect on a living body, and silicone rubber, such as a synthetic rubber or crude rubber, It is constituted by giving elasticity to the attachment component itself by performing slit processing etc. to the elastic body which fabricated materials which have spring nature, such as a stainless plate and a phosphor bronze board, or the attachment component 4. When the passage means 1 is formed with a magnetic body or a magnet, it is also possible to constitute the receiving means 3 with a magnet or a magnetic body.

[0029]When rubber, a metal plate, a magnet, a magnetic body, etc. constitute the receiving means 3 like the above, the receiving means 3 is in the state which fitted into the hole 4a formed at the tip of the attachment component 4, or is held in the state where it pasted up with adhesives. For this reason, there is a possibility that a very minute opening may be formed between the receiving means 3 and the hole 4a, and there is a possibility that it may become difficult to perform perfect sterilization treatment after the operation. Therefore, the receiving means 3 is constituted removable to the attachment component 4, and, as for after an operation, it is preferred to lay on the shelf of this receiving means 3.

[0030]When slit processing and the special mechanism as opposed to the attachment component 4 for the receiving means 3 are incorporated and constituted, it becomes indispensable to fully carry out sterilization treatment of this machining part or the working part.

[0031]Hereafter, a concrete example is described separately.

[0032]As shown in drawing 2, when the passage means 11 counters the receiving means 3 by the carrying member 2 and attachment component 4 grasping operation, the threader implement A concerning the 1st example is constituted so that the thread 7 held at the tip part of this passage means 11 may be hooked and it may receive directly.

[0033]In the figure, the passage means 11 adheres at the tip of the carrying member 2, and is constituted in one. The tip of the passage means 11 is formed in flat state, as shown in the Drawing (a) and (b), the central projection 11a with high height is formed in the crosswise center, and the shoulder projection 11b is formed in the both sides of this projection 11a. Between the central projection 11a and the shoulder projection 11b, the slit 11c is formed, respectively, and 11 d of slots are formed in the central projection 11a along shaft orientations.

[0034]The slit 11c is formed with the size according to the thickness of the thread 7. That is, the slit 11c is

formed with the size slightly narrower than the thickness of the thread 7. And as shown in the figure (c), it comprises making the thread 7 which is the circumference of the central projection 11a and was turned to the slot 11d side engage with the slit 11c so that the thread 7 can be held by collaboration with the central projection 11a and the shoulder projection 11b.

[0035]The rod-like structure 8 which countered the attachment component 4 with said 11 d of slots, and formed the hook-like hooking part 8a at the tip is attached.

[0036]If the handle 6 is grasped and the carrying member 2 and the attachment component 4 are made to approach in the threader implement A constituted like the above, If between organizations or an in-house is passed where the thread 7 is held, and the hooking part 8a of the rod-like structure 8 counters 11 d of slots of the passage means 11, the passage means 11, It is possible to maintain and receive the state where this hooking part 8a hooked the thread 7, and was engaged, and the thread 7 engaged with the hooking part 8a with isolation with the carrying member 2 and the attachment component 4 further.

[0037]Next, the threader implement A which starts the 2nd example by drawing 2 is explained. In this example, as the passage means 1, the same thing as the passage means 11 in the 1st example is used, and concrete explanation is omitted. However, 11 d of slots formed in the central projection 11a are unnecessary.

[0038]The receiving means 31 counters with the passage means 11, and is arranged. The slit 31a corresponding to the flat shape of the passage means 11 is formed in this receiving means 31 so that the flat state passage means 11 can fit in easily. The field which counters the passage means 11 of the receiving means 31 is formed as the inclined plane 31b sloping from the circumference side towards the slit 31a, in order to introduce the passage means 11 into the slit 31a.

[0039]The crevice 31c is formed in the opposite hand of the passage means 11 of the receiving means 31, and the press piece 31d is formed of the inclined plane 31b and the crevice 31c. Therefore, by setting up the depth of the crevice 31c suitably, it is possible to set up the thickness of the press piece 31d, and it is possible to set up the thrust which acts on the passage means 11 which fitted in by setting up suitably the thickness which is the press piece 31d.

[0040]In the threader implement A which attached the passage means 11 constituted like the above, and the receiving means 31. Hold this thread 7 by the passage means 11, insert in the affected part in this state, carry out grasping operation of the threader implement A, the passage means 11 and the receiving means 31 are made to approach relatively, and the passage means 11 is made to fit into the receiving means 31 by making the thread 7 engage with the slit 11c formed in the passage means 11 beforehand. By this grasping operation, the thread 7 is turned to the surroundings of the blood vessel which should be ligated, and the thrust by the receiving means 31 acts on the thread 7.

[0041]Subsequently, if opening operation of the threader implement A is carried out and the passage means 11 and the receiving means 31 are made to isolate, the passage means 11 will secede from the receiving means 31. At this time, by the thrust by the press piece 31d of the receiving means 31, the thread 7 secedes from the slit 11c of the passage means 11, and is pinched by the press piece 31d. That is, the thread 7 is received by the receiving means 31. Then, if the threader implement A is pulled out outside of the body, the thread 7 will maintain the state where it was pinched by the press piece 31d of the receiving means 31, and will be pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 secede from the receiving means 31 easily by pulling the thread 7.

[0042]Like the above, when an operating person operates the single step of only grasping, opening and closing the handle 6 of the threader implement A, it is possible to turn the surroundings of a blood vessel and to receive the thread 7 held at the passage means 11 by the receiving means 31.

[0043]It is possible to use what formed the slot 11e which stops and holds the thread 7 at the tip, the thing in which 11 f of holes held through the thread 7 near the tip were formed, etc., as passage means 11 other than the above, as shown in drawing 4.

[0044]When the passage means 11 like the above is used, it is possible to use selectively the receiving means 31 which has the rod-like structure 8 or elasticity in which the hooking part 8a in the 1st example was formed as the receiving means 3.

[0045]Next, the threader implement A which starts the 3rd example by drawing 5 is explained.

[0046]The passage means is constituted in this example by the length set up beforehand and the cylindrical

style 12 which has thickness, The blind hole which spherical or is not illustrated in the former end face 12b which it is formed in the shape of \*\*, and is a rear end face is formed so that the tip 12a may pass easily between a living body's organizations or an in-house. And by inserting the end of the thread 7 in said blind hole, and closing the circumference of this blind hole, the thread 7 is held at the style 12. It is preferred to use the atraumatic needle 12 mentioned later as said style 12.

[0047]The fitting part 2a which attaches the style 12 removable is formed at the tip of the carrying member 2 of the threader implement A. The fitting part 2a has the function to hold the attached style 12 temporarily. That is, the style 12 fits into the receiving means 32 with grasping operation of the carrying member 2 and the attachment component 4.

Then, in connection with the opening operation of each of said members 2 and 4, the style 12 secedes from the fitting part 2a, and is received by the receiving means 32.

[0048]the fitting part 2a which holds the style 12 temporarily is shown in drawing 6 — as — the prescribed position by the side of the tip of the carrying member 2 — the outer diameter of the style 12, and abbreviation — the crevice 2a with an equal path is formed, and this crevice 2a and a tip are connected with slit 2b, and it is constituted.

[0049]Therefore, the thread 7 which attached eye \*\* is inserted in via slit 2b, and it is possible to attach the style 12 to the carrying member 2 by making the former end face 12b side of the style 12 fit into the crevice 2a which is the fitting part 2a. The style 12 attached in this way holds the state where it fitted into the crevice 2a, and it does not secede from it simply.

[0050]The resistance which generates the style 12 when passing between organizations or an in-house is transmitted to the carrying member 2 via the contact surface of the former end face 12b of the style 12, and the crevice 2a. Therefore, when the style 12 passes through an organization, it does not secede from the carrying member 2 by pass resistance, or it does not fall.

[0051]The receiving means 32 presses and holds the periphery of this style 12, when the style 12 fits in with grasping operation of the threader implement A, By maintaining the pressing state over the style 12 and making it secede from the crevice 2a, when the carrying member 2 and the attachment component 4 are isolated in connection with the opening operation of the threader implement A, the thread 7 is received substantially.

[0052]for this reason — the center of the receiving means 32 — the outer diameter of the style 12, and abbreviation — it is equal, or the hole 32a with a slightly small path is formed, and the slideway 32b for showing this style 12 to the hole 32a is formed in the style 12 and the field which counters.

[0053]Next, drawing 7 explains like the above the case where the blood vessel E is ligated using the threader implement A which attached the style 12 and the receiving means 32.

[0054]As shown in the figure (a), it inserts in the inner part of the blood vessel E which should be ligated in the state which opened the threader implement A wide, i.e., the state where the style 12 and the receiving means 32 were made to isolate.

Then, the style 12 is made to fit into the receiving means 32, as grasping operation of the handle 6 is carried out and it is shown in the figure (b).

At this time, the style 12 is pressed by the receiving means 32 and held.

[0055]Subsequently, the style 12 secedes from the crevice 2a, and is held at the receiving means 32, and the thread 7 turns around the surroundings of the blood vessel E, and it means that it had been substantially received by the receiving means 32 via the style 12 as by carrying out opening operation of the threader implement A showed to the figure (c). In connection with the drawer to the outside of the body of the threader implement A, as shown in the figure (d), the thread 7 is also pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 and the style 12 secede from the receiving means 32 by pulling the thread 7.

[0056]It is possible like the above to adjust the holding power of the style 12 by the receiving means 32 by setting up the diameter and length of the hole 32a suitably in the style 12 and the receiving means 32 which were constituted. However, when making the style 12 secede from the receiving means 32, there is a possibility that comparatively big power may be required.

[0057]Next, the composition of the threader implement A which starts the 4th example by drawing 8 is explained.

[0058]The threader implement A concerning this example attaches to the carrying member 2 the style 13 which formed the spherule 13a at the tip removable, and it is a figure explaining the important section of the threader implement A which attached the receiving means 33 in which the spherical part 33a which accepts said spherule 13a was formed at the tip of the attachment component 4. It makes it possible to make the style 13 by which press holding was carried out to the receiving means 33 secede from this threader implement A easily by small power.

[0059]The spherule 13a with a larger path than the thickness of the style 13 is formed at the tip of the style 13, and the composition of those other than this spherule 13a is constituted like the style 12 mentioned above.

[0060]The spherical part 33a which accepts the spherule 13a is formed in the style 13 and opposite hand of the receiving means 33, and the slideway 33b which shows the spherule 13a to the spherical part 33a is formed in the style 13 and the field which counters. The hole 33c which connected the slideway 33b with the spherical part 33a, and had a slightly larger and path smaller than the path of the spherule 13a than the thickness of the style 13 is formed. Therefore, 33 d of projections are formed in accordance with the circumference of the hole 33c.

[0061]In the above-mentioned composition, the style 13 approaches the receiving means 33 with grasping operation of the threader implement A, and the spherule 13a fits into the spherical part 33a through the hole 33c. And if opening operation of the threader implement A is carried out, the carrying member 2 and the attachment component 4 are isolated with this operation, and the style 13 will secede from the crevice 2a, and will be held at the spherical part 33a of the receiving means 33.

[0062]If the thread 7 is pulled as it becomes parallel to the attachment component 4 as shown in drawing 8 (b) when pulling out the threader implement A outside of the body and making the style 13 secede from the receiving means 33, the base 13b of the spherule 13a will engage with 33 d of projections, and the style 13 will be rotated by making this engagement part into a fulcrum. With said rotation, the style 13 secedes from the receiving means 33 because the fulcrum and opposite hand of the spherical part 13a overcome 33 d of projections.

[0063]It is possible to make it very smaller than the power at the time of making the style 12 which mentioned above the power taken to apply the principle of a lever when making the style 13 secede from the receiving means 33 like the above to make the style 13 break away secede from the receiving means 32.

[0064]When litigating using the styles 12 and 13, whenever it carries out one ligation, it will be necessary for the threader implement A to attach the styles 12 and 13, and will lay on the shelf of the styles 12 and 13 for every one ligation.

[0065]Next, the composition of the threader implement A which starts the 5th example by drawing 9 is explained.

[0066]The position through implement A shown in a figure inserts in and holds the thread 7 to the shaft orientations of the style 14 attached to the carrying member 2, Make the style 14 fit into the receiving means 34 with grasping operation of the threader implement A, the style 14 is made to secede from the receiving means 34 in connection with the opening operation of the threader implement A, and it is a figure explaining the important section of the threader implement A constituted so that the thread 7 might be received by the receiving means 34.

[0067]The style 14 inserts in the thread 7 which has the larger diameter parts 7a, such as incidental looping which tied and formed the thread 7 in part, the conclusion ball or a ball which applied adhesives and was solidified, and a ball formed by fixing to thread the ball of the metal containing stainless steel, along shaft orientations, and. Stop and hold said larger diameter part 7a at a tip, and with grasping operation of the threader implement A, with the thread 7, pass between a living body's organizations or through under an organization, and it fits into the receiving means 34, And it is constituted so that it may be possible to receive the thread 7 by the receiving means 34, when seceding from the receiving means 34 in connection with the opening operation of the threader implement A.

[0068]In order to insert in the thread 7, the slit 14a with the size according to the thickness of this thread 7 is formed in the style 14 covering the overall length. The slit 14a is formed so that a pars basilaris ossis occipitalis may reach the center of the style 14, and in order to hold the larger diameter part 7a of the thread 7, the attaching part 14b of sphere form is formed at the tip of the style 14. The style 14 is

attached to the fitting part 2a formed in the carrying member 2 removable.

[0069]The fitting part 2a which consists of the hole 2a with a path slightly smaller than the outer diameter of the style 14 as shown, for example in drawing 10 is formed at the tip of the carrying member 2. This hole 2a is wide opened with slit 2b at the tip side of the carrying member 2, and it is possible to insert the thread 7 in the slit 14a of the style 14 via slit 2b.

[0070]The oblong hole 2c where width is comparatively large is formed in the opposite hand of slit 2b of the hole 2a, this oblong hole 2c and hole 2a are connected, and the slit 2d is formed. That is, the two sandwiching pieces 2e in which the tip of the carrying member 2 had spring nature with the oblong hole 2c, the hole 2a, the slit 2d, and 2b are formed.

[0071]In the above-mentioned composition, since the hole 2a has a path smaller than the outer diameter of the style 14, when the style 14 is attached to the hole 2a, the style 14 is pressed with the sandwiching piece 2e, and is held firmly. The holding power over the style 14 by the sandwiching piece 2e can be set as a desired value by setting up suitably the ratio of the outer diameter of this style 14, and the path of the hole 2a, the length of the oblong hole 2c, etc. Therefore, when the style 14 passes between organizations or through under an organization, it does not secede from the hole 2a.

[0072]The hole 34a into which the tip end part of the style 14 is made to fit is formed in the center of the receiving means 34, and the slideway 34b which shows the hole 34a to the tip of this style 14 is formed in the style 14 and the field which counters. The crevice 34c is formed in the opposite hand of the receiving means 34.

[0073]The above-mentioned hole 34a is formed with the very small size (pinhole) so that it may be possible to press and receive the larger diameter part 7a of the thread 7. The portion into which the tip of the style 14 is made to fit does not necessarily need to be the hole 34a, and the piece cut deeply and formed in the shape of a single character, the shape of triradius, and cross shape from the slideway 34b of the receiving means 34 to the crevice 34c may constitute it.

[0074]When the style 14 fits into the receiving means 34, the thrust to the style 14 by the receiving means 34 needs to be smaller than the holding power of the style 14 by the sandwiching piece 2e of the carrying member 2. The thrust to the style 14 of the receiving means 34 can be adjusted with the depth of the material which constitutes the receiving means 34, and the crevice 34c. Therefore, the receiving means 34 is designed in consideration of said conditions.

[0075]In the above-mentioned composition, if the style 14 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the tip which the style 14 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 34. Subsequently, if opening operation of the threader implement A is carried out, the style 14 will secede from the receiving means 34 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the hole 34a of the receiving means 34. And it is possible to make it secede from the receiving means 34 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0076]When the above-mentioned style 14 is used, it is required to insert the thread 7 in the style 14 for every one ligation, but the style 14 can be used continuously. For this reason, when there are many ligation parts, what is necessary will be to exchange only the thread 7, and it is advantageous from a cost side.

[0077]Even if it is a case where such a style 14 is used, there is a possibility that an opening may be formed between the style 14 and the hole 2a which is the fitting parts 2a. For this reason, as for the style 14, since a possibility that said opening cannot be sterilized thoroughly arises when carrying out postoperative sterilization treatment, it is preferred to lay on the shelf for every one operation.

[0078]Drawing 11 is a figure explaining the important section of the threader implement A adapting the structure shown in the 5th above-mentioned example.

[0079]The slot 15a holding the thread 7 which has the larger diameter part 7a is formed at the tip of the style 15, and the slit 15b which shows the thread 7 to the operating person side along with the carrying member 2 is formed in the back end. This needlelike end 15 is attached to the fitting part 2a which consists of the hole 2a formed at the tip of the carrying member 2 like the style 14 mentioned above removable.

[0080]The slit 35a into which the slot 15a formed at the tip of the style 15 is made to fit is formed in the center of the receiving means 35, and the slideway 35b which shows the slit 35a to the tip of this style 15

is formed in the style 15 and the field which counters. The crevice 35c is formed in the opposite hand of the receiving means 35.

[0081]In the above-mentioned composition, if the style 15 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the slot 15a which the style 15 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 35. Subsequently, if opening operation of the threader implement A is carried out, the style 15 will secede from the receiving means 35 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the slit 35a of the receiving means 35. And it is possible to make it secede from the receiving means 35 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0082]Next, drawing 12 explains the case where metal with spring nature constitutes the receiving means 3.

[0083]The metal plate which the receiving means 36 shown in the figure (a) had spring nature, or can demonstrate spring nature by heat treatment, For example, thickness abbreviation which consists of stainless steel Press forming of the 0.1-mm board is carried out, it is constituted, and it assumes receiving the style 12 with which it was equipped removable to the carrying member 2 as the passage means 1.

[0084]The flange 36a which was formed in the side which counters the receiving means 36 with the passage means 1 of the hole 4a of the attachment component 4 and which becomes depressed and fits into 4b, When the tip end part of the style 12 fits in, two or more slits 36c formed in the funnel shape receipt part 36b which presses this fitting part, and the receipt part 36b are formed, respectively.

[0085]The above-mentioned slit 36c is formed considering 36 d of skirts of the receipt part 36b as the starting point. For this reason, when the tip end part of the style 11 fits into the receipt part 36b, a possibility that 36 d of skirts may be expanded and thrust large enough cannot be acted arises. In order to solve this problem, the O ring shape member 36e which prevents 36 d of skirts of the receipt part 36b from being expanded is formed in the back side of the receipt part 36b.

[0086]When the tip end part of the style 11 fits into the receipt part 36b in the receiving means 36 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 36b. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 36, and secedes from the fitting part 2a of the carrying member 2.

[0087]The receiving means 37 shown in the figure (b) is constituted supposing receiving the style 12 like the above-mentioned receiving means 36. This receiving means 37 is formed by machining, for example, engine-lathe processing.

[0088]The flange 37a and the boss 37b are formed in the receiving means 37, and the boss 37b is in the hole 4a, abbreviation, etc. which were formed in the attachment component 4 by carrying out, and has a size. The hard drum-like receipt part 37c is formed succeeding the boss 37b, and 37 d of skirts of this receipt part 37c have a slightly larger size than the hole 4a. The tapered shape slideway 37e which is missing from the boss 37b from the flange 37a, and shows the tip of the style 12 in the direction of the receipt part 37c is formed, and two or more slits 37f are further formed in the receipt part 37c.

[0089]Therefore, it is possible to give spring nature to the receipt part 37c because 37 d of skirts are regulated by the hole 4a and transform the receiving means 37, when it fits into the hole 4a.

[0090]When the tip end part of the style 11 fits into the receipt part 37c in the receiving means 37 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 37c. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0091]Next, drawing 13 explains the composition of further others of the receiving means 3.

[0092]The receiving means 38 shown in a figure is constituted so that it may be possible to collaborate with the hole 4a formed in the attachment component 4, and to receive the style 12, and thrust may be made to act on the style 12 which fitted into the hole 4a with the flat spring 38 built into the attachment component 4.

[0093]The metal plate in which the flat spring 38 had spring nature, for example, thickness abbreviation

which consists of stainless steel, A 0.3-mm board is processed and it is constituted. It is constituted by the flat spring 38 by the press piece 38a which attends the hole 4a of the attachment component 4, and presses the style 12, and the suspension arm 38b provided in the prescribed position of the press piece 38a.

[0094]Near the hole 4a formed in the attachment component 4, the hollow 4c incorporating the flat spring 38 is formed.

The suspending portion 4d which stops the suspension arm 38b of the flat spring 38 is formed in the prescribed position of this hollow 4c.

The tapered shape slideway 4e is formed in the side which counters the style 12 of the hole 4a.

[0095]It is possible like the above to hold by the press piece 38a of the flat spring 38 giving thrust to the style 12 which fitted into the hole 4a in the constituted receiving means 38, and making the style 12 weld by pressure to the hole 4a. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0096]In the above-mentioned composition, it is preferred to provide the slot which engages with the press piece 38a of the flat spring 38 for the purpose of receiving the style 12 more certainly at the style 12. In this case, form the flat spring 38 in lever shape with a long overall length, and a pin is formed in the attachment component 4. Because energize so that a pin may be equipped with the flat spring 38 rotatable and the press piece 38a may always project inside the hole 4a, and make the end side of another side project from an attachment component and an operating person pushes this lobe. The press piece 38a is evacuated from the hole 4a, and it may constitute so that the style 12 may be made to secede from the hole 4a.

[0097]Next, drawing 14 explains the atraumatic needle which constitutes the style 12. The same numerals are given to the portion which has the style 12, identical parts, or the same function in the example of the following atraumatic needles.

[0098]The atraumatic needle 12 is formed in shape, such as spherical or the shape of \*\*, corresponding to the organization with predetermined length which should pass so that it may be formed direct needlelike and the tip 12a can run through between organizations or with an in-house smoothly. The thread 7 is installed in the shaft orientations of the atraumatic needle 12 from the former end face 12b. That is, a blind hole or a slot with the size corresponding to the specification of the thread 7 is formed in the former end face 12b of the atraumatic needle 12, and it is constituted so that the end of the thread 7 is inserted in this blind hole and a slot, it may caulking(refer to the figure (a) )-\*\*, or it may paste up (refer to the Drawing (b) and (c)) and the portion corresponding to a blind hole can be held. It is also possible to constitute the atraumatic needle 12 which carries out integral moulding of the thread 7 with insert molding method, and consists of synthetic resins so that it may mention later.

[0099]The sectional shape in particular of the drum section 12c of the atraumatic needle 12 is not limited. That is, since this atraumatic needle 12 is not grasped by the needle holder when undergoing an operation, it does not need to be the shape where grasping by the needle holder was assumed.

[0100]The former end 12d of the atraumatic needle 12 is temporarily held in the state where it fitted into the fitting part 2a formed in the carrying member 2. for this reason, the portion corresponding to [ are a portion which fits into the fitting part 2a at least, and ] the pars basilaris ossis occipitalis and edge of this fitting part 2a — the fitting part 2a and abbreviation — it is equal or it is required to be a slightly small size.

[0101]That is, as shown in the figure (a), when the slot 12e formed of the caulking is in agreement with the opening edge of the fitting part 2a, it is difficult to make the atraumatic needle 12 hold to the fitting part 2a in the state where it was stabilized.

[0102]When the fitting part 2a of the carrying member 2 is equipped with the atraumatic needle 12, the driving force with which the former end face 12b acts on the carrying member 2 in contact with the pars basilaris ossis occipitalis of the fitting part 2a is transmitted. For this reason, it is required for the former end face 12b holding the thread 7 to have this thread 7 and a clear level difference.

[0103]The thickness of the thread 7 used when litigating a blood vessel is abbreviation. The thickness of the thread 7 which is 0.3 mm – about 0.4 mm, and is used when suturing an incision part is abbreviation. They are 0.2 mm – about 0.3 mm. When performing ligation or a suture, power required to pass between

organizations or an in-house for the atraumatic needle 12 is about abbreviation 50g– 200g. When receiving the power of said extent in the former end face 12b, it is abbreviation to the circumference of the thread 7. The level difference (exposed surface of the former end face 12b) of about 0.1 mm should just be formed. For this reason, the thickness of the atraumatic needle 12 is set as about 0.8 mm – about 1 mm.

[0104]When equipping with the atraumatic needle 12 the threader implement A shown in drawing 1 and performing ligation or a suture, the tip 12a of the atraumatic needle 12 performs rotating motion according to the distance from the axis 5 to the fitting part 2a, and fits into the receiving means 3. For this reason, when the length of the atraumatic needle 12 is long, and the tip 12a fits into the receiving means 3, there is a possibility that the power of the direction which intersects the major axis of the atraumatic needle 12 may act, and smooth fitting cannot be made. For this reason, the overall length of the atraumatic needle 12 is set as the range of 3 mm – about 10 mm.

[0105]When using for the threader implement A which has the receiving means 3 constituted with the flat spring 38 in the atraumatic needle 12 as shown in drawing 13, 12 f of slots are formed in the position which carried out prescribed distance over the perimeter from the tip 12a of the atraumatic needle 12. 12 f of slots are because the press piece 38a of the flat spring 38 is engaged, by forming 12 f of this slot, can hold certainly the atraumatic needle 12 which fitted into the hole 4a of the attachment component 4, and can receive it.

[0106]Distance from the tip 12a to 12f of slots is not limited. However, as for 12 f of slots, it is preferred to be formed in the portion 12c which the portion linked to the both sides of 12 f of these slots is parallel, and is in the path of the hole 4a, abbreviation, etc. by carrying out, and has a size, for example, a drum section. In this case, it is not shaky, when the atraumatic needle 12 fits into the hole 4a and is held with the flat spring 38.

[0107]It is preferred to use SUS303 (stainless steel) or BSBM (free cutting brass) with a comparatively cheap price as a material at the time of constituting the atraumatic needle 12. It is possible by using such a material to reduce the cost of the atraumatic needle 12.

[0108]It is also possible to carry out the fabricating operation of the synthetic resin material, and to constitute the atraumatic needle 12. In this case, it is preferred to make it unify simultaneously with shaping of the atraumatic needle 12, and to install the thread 7 in the shaft orientations of the atraumatic needle 12 from the former end face 12b with insert molding method. The atraumatic needle 12 manufactured by this method can supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is possible to carry out discarding treatment of the atraumatic needle 12 after use easily.

[0109]Next, other composition of the attachment component 4 which attaches the carrying member 2 which attaches the passage means 1, and the receiving means 3 is explained.

[0110]Drawing 15 is a figure explaining the composition of the threader implement B which gave spring nature and connected the carrying member 2 and the attachment component 4. This threader implement B is constituted so that an operating person may be able to operate it at the same feel as tweezers.

[0111]The tip end part (left-hand side of drawing 15) of the carrying member 2 and the attachment component 4 is formed with moderate rigidity, and spring nature is given to a former portion (right-hand side of drawing 15), and the threader implement B is joined mutually. Even if it is the threader implement B constituted in this way, like each example mentioned above, make the passage means 11 unite with the carrying member 2, or the styles 12–14 are attached removable, and it is possible to attach the receiving means 31–38 to the attachment component 4, and to perform ligation of a blood vessel and the suture of an incision part.

[0112]Drawing 16 is a figure explaining the composition of the threader implement C which formed the tip of the carrying member 2 circularly. In the figure, the carrying member 2 and the attachment component 4 are attached to the axis 5 like the threader implement A, and are constituted rotatable mutually.

[0113]As for the attachment side of the passage means 1 in the carrying member 2, the linear shape straight part 2f which has the length beforehand set up from the axis 5 is formed, and the arc part 2g which makes said length a radius is formed in the tip side which is this straight part 2f. And the passage means 1 is attached at the tip of the arc part 2g. The attachment side of the receiving means 3 in the attachment component 4 is installed by linear shape from the axis 5, and the receiving means 3 is attached to the length of the straight part 2f of the carrying member 2, and a corresponding position.



[0114]Like the above, in connection with the switching operation of the handle 6, the passage means 1 will move and carries out disjunction of the same circumference top to an abbreviated straight-line target in the constituted threader implement C to the receiving means 3 arranged on this circumference. For this reason, it becomes possible more correctly and to ensure receipt operation of the thread 7 by the receiving means 3.

[0115]That is, when the passage means 1 are the styles 12 and 13 attached to the carrying member 2 removable, in order that the styles 12 and 13 may fit in linearly to the receiving means 3 in connection with the switching operation of the threader implement C, power which becomes complicated to the styles 12 and 13 does not act. For this reason, it is possible to make the styles 12 and 13 fit into the receiving means 3 certainly.

[0116]Drawing 17 is a figure explaining the composition of the threader implement D which made it possible to perform the ligation and the suture in a very deep position, for example, the operation in the laparoscope. in the figure, the carrying member 2 and the attachment component 4 are arranged at the tip side of the casing 41 with predetermined length (responding to the part which should be ligated — abbreviation [ ] — 300 mm – 400 mm), and at least one members 2 and 4 are constituted so that disjunction can be carried out to the member of another side. In this example, the attachment component 4 is adhered at the tip of the casing 41, and it has attached to the axis which does not illustrate the carrying member 2 rotatable.

[0117]The casing 41 is attached to the operating grip 42 which formed the trigger 43, and the trigger 43 and the carrying member 2 are connected via conduction members which have been arranged inside the casing 41 and which are not illustrated, such as a wire or a rod. To constitute so that disjunction of the carrying member 2 and the attachment component 4 of each other can be carried out, it is required to connect the trigger 43, the carrying member 2, and the attachment component 4 by a conduction member.

[0118]Therefore, when an operating person operates the trigger 43, this operating physical force is transmitted to the carrying member 2 via a conduction member, and the thread 7 with which each member 2 approached the attachment component 4, and was held at the passage means 1 is received by the receiving means 3.

[0119]Like the above, it is preferred to form the casing 41 in the constituted threader implement E using the material which has flexibility, and it is desirable to form to such an extent that thickness can be inserted in an endoscope. By constituting the threader implement E from said conditions, it is possible to perform easily the ligation and the suture in the operation in the laparoscope carried out an endoscope supervising.

[0120]When ligating especially in the case of the operation in the laparoscope, what is called a medical-application clip is used now in many cases. However, when using a clip, there are problems, such as a point that shape is large, a point with a possibility that a clip may separate from a ligation part, and a point that a blood vessel must be made to exfoliate from the surrounding organization, but it becomes possible by using the above-mentioned threader implement E to avoid said each problem.

[0121]Although it is possible in each above-mentioned threader implement A–E to form each members forming with metallic materials, such as stainless steel, constituting with the mold goods of a synthetic resin is also possible. For example, when threader implement A–E is constituted from fabricating and assembling the carrying member 2, the attachment component 4, and the member of axis 5 grade with a synthetic resin, it is possible to supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is also possible to carry out discarding treatment of threader implement A–E after use easily.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1]It is a side view explaining the entire configuration of the threader implement constituted so that a carrying member and an attachment component might be rotated focusing on an axis and disjunction of a passage means and the receiving means might be carried out.

[Drawing 2]It is a figure explaining the important section of the threader implement concerning the 1st example constituted so that thread might be hooked and received.

[Drawing 3]It is a figure explaining the composition of the passage means and receiving means concerning the 2nd example.

[Drawing 4]It is a figure explaining other composition of a passage means.

[Drawing 5]It is a figure explaining the important section of the threader implement concerning the 3rd example that constituted the passage means removable to the carrying member.

[Drawing 6]It is a figure explaining the important section of the carrying member which attaches a passage means removable.

[Drawing 7]It is a figure explaining a ligation operational sequence.

[Drawing 8]It is a figure explaining the important section of the threader implement concerning the 4th example that constituted the passage means removable to the carrying member.

[Drawing 9]It is a figure explaining the important section of the threader implement concerning the 5th example that constituted the passage means removable to the carrying member.

[Drawing 10]It is a figure explaining the important section of the carrying member which attaches a passage means removable.

[Drawing 11]It is a figure explaining the application of the 5th example.

[Drawing 12]It is a figure explaining other examples of composition of a receiving means.

[Drawing 13]It is a figure explaining the example of composition of further others of a receiving means.

[Drawing 14]It is a figure explaining the composition of an atraumatic needle.

[Drawing 15]It is a side view explaining the entire configuration of the threader implement which gave spring nature and connected the carrying member and the attachment component.

[Drawing 16]It is a side view explaining the entire configuration of the threader implement which formed the tip end part of the carrying member circularly.

[Drawing 17]It is a side view explaining the entire configuration of the threader implement which made it possible to litigate a deep part easily or to suture.

[Description of Notations]

A-D threader implement

1 and 11 Passage means

11c Slit

11d and 11e Slot

11 f Hole

12 A style, an atraumatic needle

12a Tip

12b Former end face

12c Drum section

12 d Former end

12e Slot  
12 f Slot  
13-15 Style  
13a Spherule  
14a and 15a Slit  
2 Carrying member  
2a A fitting part, a crevice, a hole  
2e Sandwiching piece  
2 f Straight part  
2 g Arc part  
3, 31-38 Receiving means  
31a Slit  
32a Hole  
33a Spherical part  
4 Attachment component  
4a Hole  
5 Axis  
6 Handle  
7 Thread  
7a Larger diameter part  
41 Casing  
42 Grip  
43 Trigger

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[Translation done.]

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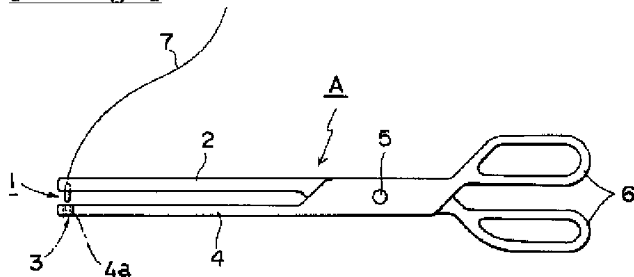
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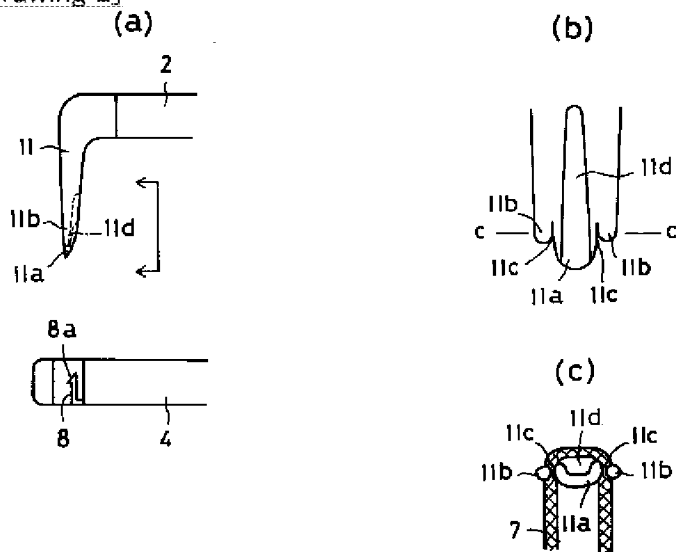
**DRAWINGS**

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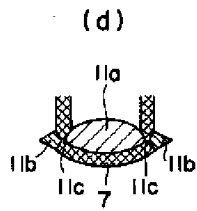
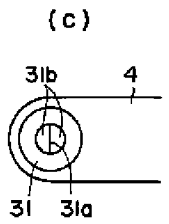
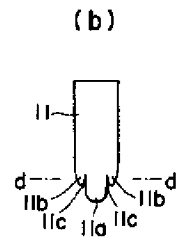
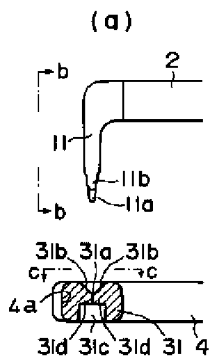
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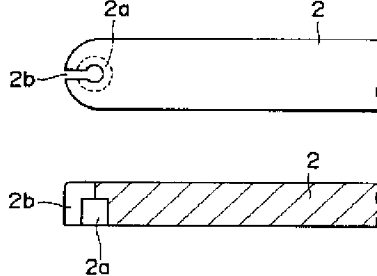
[Drawing 2]



[Drawing 3]

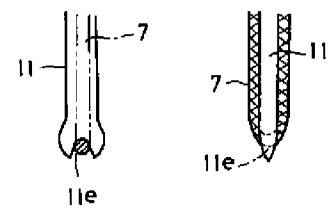


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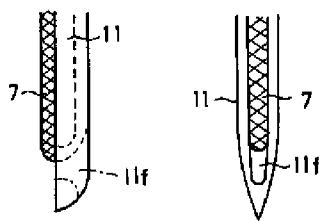


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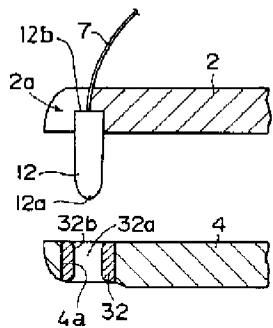
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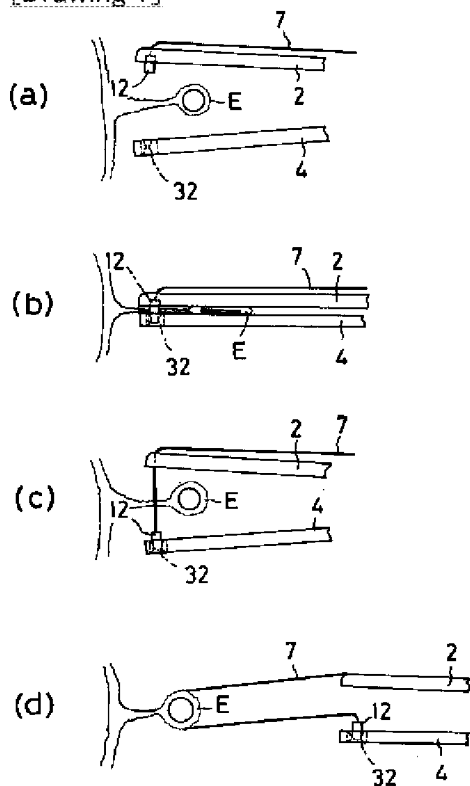
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[Drawing 5]

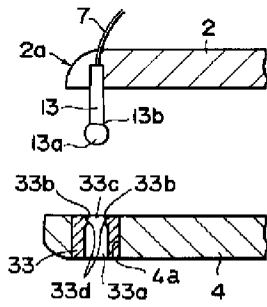


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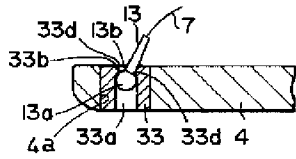


[Drawing 8]

(a)

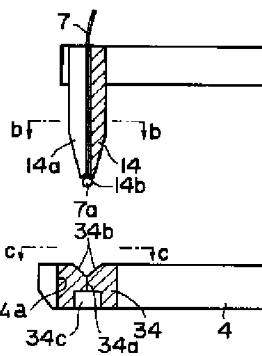


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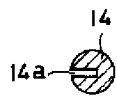


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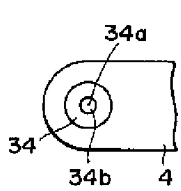
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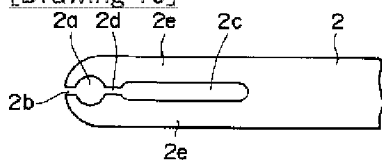
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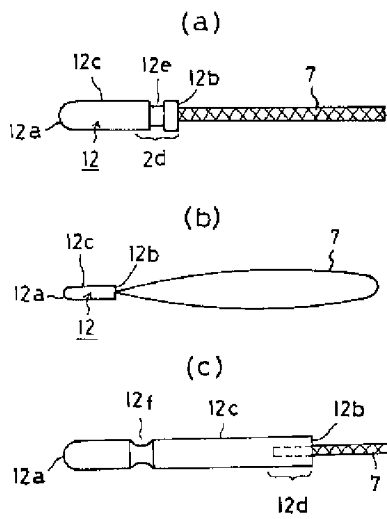
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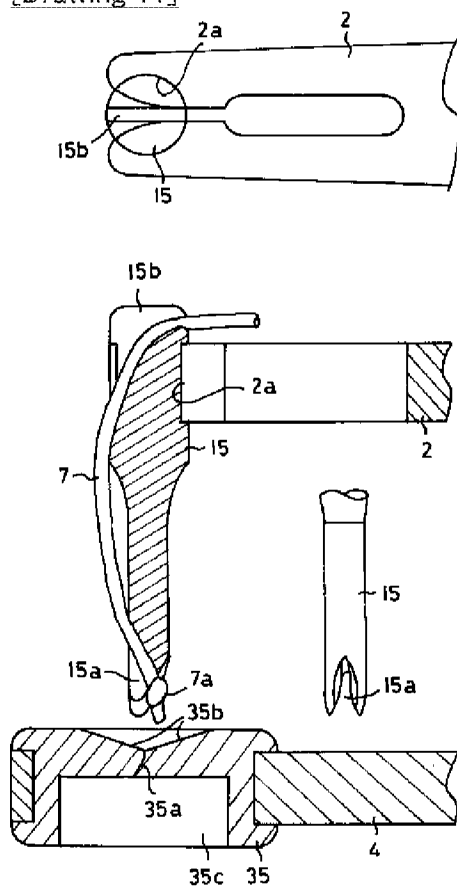
[Drawing 10]



[Drawing 14]

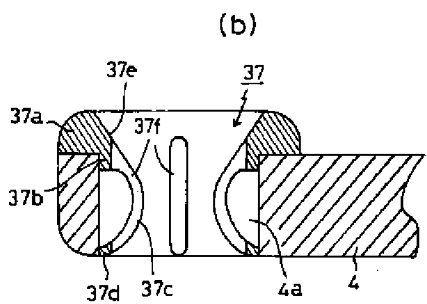
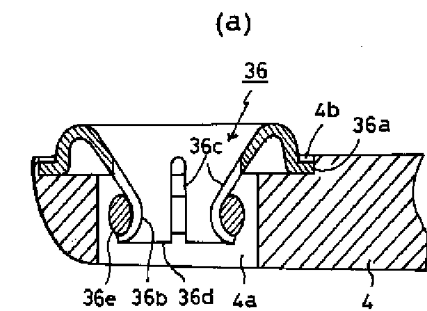


[Drawing 11]

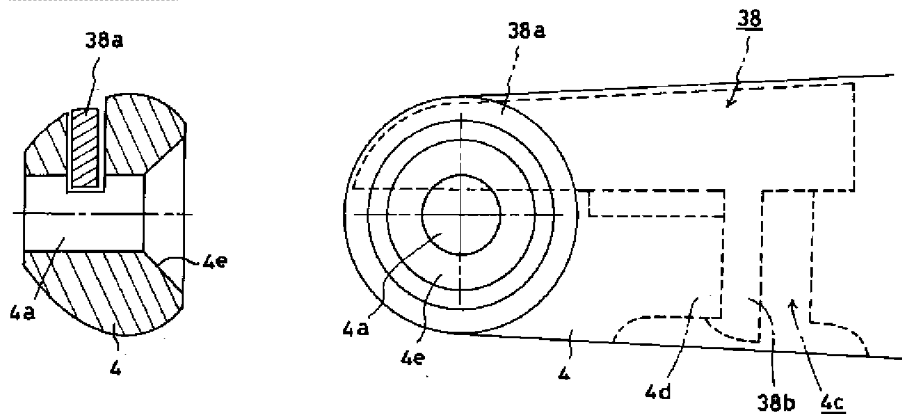


[Drawing 12]

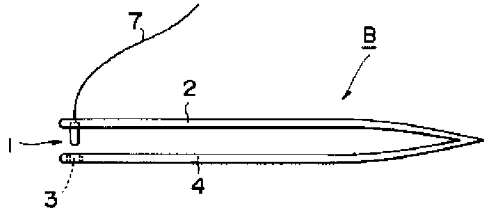




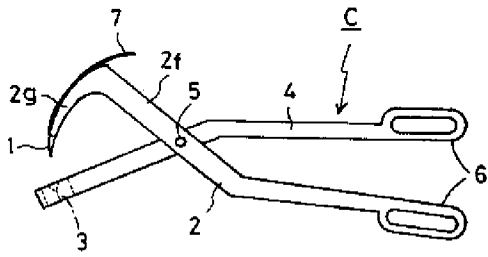
[Drawing 13]



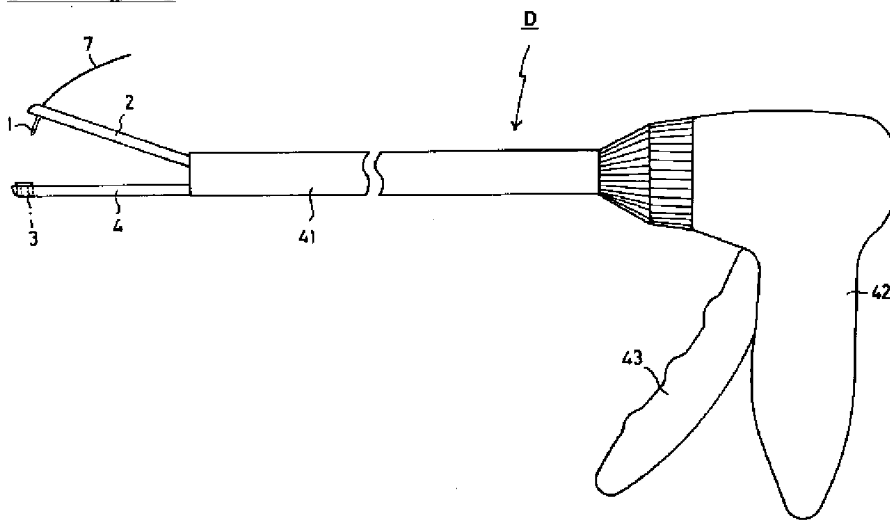
[Drawing 15]



[Drawing 16]



[Drawing 17]



[Translation done.]

DOCUMENT 1/1  
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**CORRECTION OR AMENDMENT**

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[Kind of official gazette]Printing of amendment by the regulation of 2 of Article 17 of Patent Law  
[Section classification] The 2nd classification of the part I gate  
[Publication date]September 25 (2001.9.25), Heisei 13

[Publication No.]JP,7-328020,A  
[Date of Publication]December 19 (1995.12.19), Heisei 7  
[Annual volume number] Publication of patent applications 7-3281  
[Application number]Japanese Patent Application No. 6-124947  
[The 7th edition of International Patent Classification]

A61B 17/04

17/12  
[FI]

A61B 17/04

17/12  
[Written amendment]  
[Filing date]January 12, Heisei 13 (2001.1.12)  
[Amendment 1]  
[Document to be Amended]Specification  
[Item(s) to be Amended]Whole sentence  
[Method of Amendment]Change  
[Proposed Amendment]  
[Document Name]Specification  
[Title of the Invention]Medical-application threader implement  
[Claim(s)]  
[Claim 1]A passage means to hold thread and to pass between organizations or an in-house, and the 1st driving means that drives said passage means and passes between organizations or an in-house, A medical-application threader implement having a receiving means which receives substantially thread which passed between organizations or an in-house, and the 2nd driving means that drives said receiving means, having made said passage means and a receiving means counter, and having arranged.  
[Claim 2]A medical-application threader implement indicated to claim 1 having a thread holding part which is arranged so that it may be equipped with said passage means removable to said 1st driving means and a tip may project in the receiving means side from this 1st driving means, and fixes thread to the back end.  
[Detailed Description of the Invention]  
[0001]  
[Industrial Application]This invention relates to the threader implement of the medical application used when performing the suture of the ligation in a narrow part or a deep part, or an incision part.  
[0002]  
[Description of the Prior Art]Litigating with thread the blood vessel in the circumference of the affected

part which should be extracted on the occasion of a surgical operation, and suturing an incision part with thread is performed. Ligation of a blood vessel or the suture of an incision part is performed by pulling out and connecting the thread which passed between organizations or under the organization for thread by grasping the needle holder or a ligature inductor and operating the suture needle furnished with thread, and passed through the organization to the operating person side.

[0003]When carrying out the above-mentioned ligation and a suture, after an operating person has the needle holder in one hand and passes between organizations or an in-house for a suture needle, he will perform operation which has the needle holder again and samples a suture needle. For this reason, when the part which should be ligated, or the part which should be sutured is one of a living body's deep parts, operation by an operating person is difficult and development of the ligation implement and stitching tool which can be carried out promptly and certainly single hand is demanded.

[0004]For example, the suture instrument indicated by JP,5-11859,Y meets the above-mentioned demand. By operating single hand the handle and trigger which are the manual-operation parts of forceps, the suture needle formed in the tip part is operated, and it constitutes so that an operation part can be ligated or sutured.

[0005]On the other hand, by the latest operation, since making an incision part small and making a scar small as much as possible is performed, ligation and suture work are done by an increasingly narrow part.

[0006]

[Problem(s) to be Solved by the Invention]When ligating a blood vessel using the above-mentioned suture instrument, it is required that two steps of operations of the gripping operation of thread accompanying the suture operation and trigger operation by the suture needle accompanying handle operation should be performed. For this reason, when ligating by a very narrow part, complicatedness of operation cannot be wiped away, but development of the instrument which can be ligated by easier operation is desired.

[0007]The purpose of this invention is to provide the medical-application threader implement which can perform ligation of a blood vessel, or the suture of an incision part by operation of a single step.

[0008]

[Means for Solving the Problem]A medical-application threader implement (henceforth "a threader implement") which starts this invention in order to solve an aforementioned problem, A passage means to hold thread and to pass between organizations or an in-house, and the 1st driving means that drives said passage means and passes between organizations or an in-house, It has a receiving means which receives substantially thread which passed between organizations or an in-house, and the 2nd driving means that drives said receiving means, and said passage means and a receiving means are made to counter, and it is arranged and constituted.

[0009]In the above-mentioned threader implement, it is equipped with a passage means removable to said 1st driving means, and it is preferred to have a thread holding part which is arranged and fixes thread to the back end so that a tip may project in the receiving means side from this 1st driving means.

[0010]

[Function]Since the passage means and the receiving means were made to counter and it has arranged in the above-mentioned threader implement, The thread which passed between organizations or an in-house by passing between organizations or an in-house for the thread held by the passage means, and making the holding portion of thread fit into a receiving means, and making a passage means isolate from a receiving means after that is received by a receiving means. Therefore, it can ligate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0011]By what a passage means is driven by the 1st driving means, and the 1st and 2nd driving means is operated single hand, and an operating person approaches and makes isolate a passage means and a receiving means by driving a receiving means by the 2nd driving means. Between organizations or an in-house is passed for thread, and the thread which passed between organizations or an in-house is receivable by a receiving means. Therefore, it can ligate by pulling out and connecting the receiving means which received thread from a ligation part or a suture region to the outside of the body, or can suture.

[0012]Since it was equipped with the passage means removable to the 1st driving means, and it constituted so that it may be arranged so that a tip may project in the receiving means side from this 1st driving

means, and a thread holding part might be formed in the back end of a passage means and thread could be fixed to this holding part, a passage means fits into a receiving means.

Then, in connection with the 1st and 2nd driving means being isolated, it is receivable by making a passage means secede from the 1st driving means.

[0013]

[Example]The example of the above-mentioned threader implement is described using figures below. The side view explaining the entire configuration of the threader implement constituted so that drawing 1 might rotate a carrying member and an attachment component focusing on an axis and disjunction of a passage means and the receiving means might be carried out, The figure explaining the important section of the threader implement concerning the 1st example constituted so that drawing 2 might hook and receive thread, The figure explaining the composition of the passage means and receiving means which drawing 3 requires for the 2nd example, the figure with which drawing 4 explains other composition of a passage means, The figure explaining the important section of the threader implement which requires drawing 5 for the 3rd example that constituted the passage means removable to the carrying member, The figure with which drawing 6 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 7 explains a ligation operational sequence, the figure explaining the important section of the threader implement which drawing 8 requires for the 4th example that constituted the passage means removable to the carrying member, The figure explaining the important section of the threader implement which requires drawing 9 for the 5th example that constituted the passage means removable to the carrying member, The figure with which drawing 10 explains the important section of the carrying member which attaches a passage means removable, The figure with which drawing 11 explains the application of the 5th example, the figure with which drawing 12 explains other examples of composition of a receiving means, The figure with which drawing 13 explains the example of composition of further others of a receiving means, the figure with which drawing 14 explains the composition of an atraumatic needle, the side view explaining the entire configuration of the threader implement which drawing 15 gave spring nature and to which it connected the carrying member and the attachment component, They are a side view explaining the entire configuration of the threader implement with which drawing 16 formed the tip end part of the carrying member circularly, and a side view explaining the entire configuration of the threader implement which enabled it for drawing 17 to litigate a deep part easily, or to suture it.

[0014]The threader implement concerning this invention makes it possible to be that an operating person operates a single step and pulls out single hand, to pass between the organizations around a blood vessel, to litigate thread, when suturing ligation or the incision part of a blood vessel, or to pass the in-house of an incision part, to suture, and to pull out thread outside of the body. For this reason, it is possible to litigate and suture promptly and easily the blood vessel and incision part in a living body's deep part and narrow part. Although the case where a blood vessel is mainly litigated below is explained, even if it is a case where an incision part is sutured, it is possible to carry out by same operation substantially.

[0015]The threader implement A shown in drawing 1 attaches the passage means 1 to the carrying member 2 used as the 1st driving means formed in lever shape, and. The receiving means 3 is attached to the attachment component 4 used as the 2nd driving means formed in lever shape, the carrying member 2 and the attachment components 4, such as this, are attached to the axis 5 rotatable, and it is constituted. The handle 6 which serves as a final controlling element, respectively is formed in one side (right-hand side in drawing 1) rather than the axis 5 of the carrying member 2 and the attachment component 4, and it is constituted so that an operating person may be able to operate it at the same feel as forceps.

[0016]The passage means 1 is attached to the carrying member 2 where the thread 7 is held, it passes between a living body's organizations or an in-house with grasping operation of the threader implement A, and turns the surroundings of the blood vessel which should pass between organizations or an in-house and should litigate the thread 7 by this.

[0017]In this invention, it is possible to form the passage means 1 at the tip (left-hand side in drawing 1) of the carrying member 2 in one. However, when very minute slit and slot for holding the thread 7 for the passage means 1 may be formed and the sterilization treatment after an operation is taken into consideration, the sterilization treatment to said slit or a slot may become difficult. For this reason, it

constitutes so that the passage means 1 can be detached and attached to the carrying member 2, and as for after the operation, it is preferred to lay on the shelf.

[0018]The passage means 1 passes through between the organizations in the circumference of the blood vessel which should hold and litigate the thread 7, or passes the in-house in an incision part. For this reason, the shape and composition of the passage means 1 can take various gestalten so that it may mention later, and it is preferred to adopt what was most suitable corresponding to the contents and the purpose of an operation.

[0019]The receiving means 3 receives the thread 7 substantially by receiving a direct receipt or the passage means 1 for the thread 7 which passed between organizations or an in-house and was turned to the surroundings of the blood vessel with the passage means 1 directly. For this reason, the shape and composition of the receiving means 3 can take various gestalten corresponding to the shape and composition of the passage means 1 so that it may mention later. That is, with selection of the passage means 1, it is constituted so that the optimal receiving means 3 can be adopted.

[0020]When, as for the desirable gestalt of the receiving means 3, the passage means 1 fits into the receiving means 3 by grasping operation of the threader implement A, When thrust is made to act on this passage means 1 and the passage means 1 secedes from a receiving means by the opening operation of the threader implement A, the thread 7 is received via the direct or passage means 1 by operation of said thrust.

[0021]For this reason, the elastic body which fabricated rubbers containing urethane rubber without a possibility of the receiving means 3 having moderate elasticity, and having an adverse effect on a living body, and silicone rubber, such as a synthetic rubber or crude rubber, It is constituted by giving elasticity to the attachment component itself by performing slit processing etc. to the elastic body which fabricated materials which have spring nature, such as a stainless plate and a phosphor bronze board, or the attachment component 4. When the passage means 1 is formed with a magnetic body or a magnet, it is also possible to constitute the receiving means 3 with a magnet or a magnetic body.

[0022]When rubber, a metal plate, a magnet, a magnetic body, etc. constitute the receiving means 3 like the above, the receiving means 3 is in the state which fitted into the hole 4a formed at the tip of the attachment component 4, or is held in the state where it pasted up with adhesives. For this reason, there is a possibility that a very minute opening may be formed between the receiving means 3 and the hole 4a, and there is a possibility that it may become difficult to perform perfect sterilization treatment after the operation. Therefore, the receiving means 3 is constituted removable to the attachment component 4, and, as for after an operation, it is preferred to lay on the shelf of this receiving means 3.

[0023]When slit processing and the special mechanism as opposed to the attachment component 4 for the receiving means 3 are incorporated and constituted, it becomes indispensable to fully carry out sterilization treatment of this machining part or the working part.

[0024]Hereafter, a concrete example is described separately.

[0025]As shown in drawing 2, when the passage means 11 counters the receiving means 3 by the carrying member 2 and attachment component 4 grasping operation, the threader implement A concerning the 1st example is constituted so that the thread 7 held at the tip part of this passage means 11 may be hooked and it may receive directly.

[0026]In the figure, the passage means 11 adheres at the tip of the carrying member 2, and is constituted in one. The tip of the passage means 11 is formed in flat state, as shown in the Drawing (a) and (b), the central projection 11a with high height is formed in the crosswise center, and the shoulder projection 11b is formed in the both sides of this projection 11a. Between the central projection 11a and the shoulder projection 11b, the slit 11c is formed, respectively, and 11 d of slots are formed in the central projection 11a along shaft orientations.

[0027]The slit 11c is formed with the size according to the thickness of the thread 7. That is, the slit 11c is formed with the size slightly narrower than the thickness of the thread 7. And as shown in the figure (c), it comprises making the thread 7 which is the circumference of the central projection 11a and was turned to the slot 11d side engage with the slit 11c so that the thread 7 can be held by collaboration with the central projection 11a and the shoulder projection 11b.

[0028]The rod-like structure 8 which countered the attachment component 4 with said 11 d of slots, and formed the hook-like hooking part 8a at the tip is attached.

[0029]If the handle 6 is grasped and the carrying member 2 and the attachment component 4 are made to approach in the threader implement A constituted like the above, If between organizations or an in-house is passed where the thread 7 is held, and the hooking part 8a of the rod-like structure 8 counters 11 d of slots of the passage means 11, the passage means 11, It is possible to maintain and receive the state where this hooking part 8a hooked the thread 7, and was engaged, and the thread 7 engaged with the hooking part 8a with isolation with the carrying member 2 and the attachment component 4 further.

[0030]Next, the threader implement A which starts the 2nd example by drawing 2 is explained. In this example, as the passage means 1, the same thing as the passage means 11 in the 1st example is used, and concrete explanation is omitted. However, 11 d of slots formed in the central projection 11a are unnecessary.

[0031]The receiving means 31 counters with the passage means 11, and is arranged. The slit 31a corresponding to the flat shape of the passage means 11 is formed in this receiving means 31 so that the flat state passage means 11 can fit in easily. The field which counters the passage means 11 of the receiving means 31 is formed as the inclined plane 31b sloping from the circumference side towards the slit 31a, in order to introduce the passage means 11 into the slit 31a.

[0032]The crevice 31c is formed in the opposite hand of the passage means 11 of the receiving means 31, and the press piece 31d is formed of the inclined plane 31b and the crevice 31c. Therefore, by setting up the depth of the crevice 31c suitably, it is possible to set up the thickness of the press piece 31d, and it is possible to set up the thrust which acts on the passage means 11 which fitted in by setting up suitably the thickness which is the press piece 31d.

[0033]In the threader implement A which attached the passage means 11 constituted like the above, and the receiving means 31. Hold this thread 7 by the passage means 11, insert in the affected part in this state, carry out grasping operation of the threader implement A, the passage means 11 and the receiving means 31 are made to approach relatively, and the passage means 11 is made to fit into the receiving means 31 by making the thread 7 engage with the slit 11c formed in the passage means 11 beforehand. By this grasping operation, the thread 7 is turned to the surroundings of the blood vessel which should be ligated, and the thrust by the receiving means 31 acts on the thread 7.

[0034]Subsequently, if opening operation of the threader implement A is carried out and the passage means 11 and the receiving means 31 are made to isolate, the passage means 11 will secede from the receiving means 31. At this time, by the thrust by the press piece 31d of the receiving means 31, the thread 7 secedes from the slit 11c of the passage means 11, and is pinched by the press piece 31d. That is, the thread 7 is received by the receiving means 31. Then, if the threader implement A is pulled out outside of the body, the thread 7 will maintain the state where it was pinched by the press piece 31d of the receiving means 31, and will be pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 secede from the receiving means 31 easily by pulling the thread 7.

[0035]Like the above, when an operating person operates the single step of only grasping, opening and closing the handle 6 of the threader implement A, it is possible to turn the surroundings of a blood vessel and to receive the thread 7 held at the passage means 11 by the receiving means 31.

[0036]It is possible to use what formed the slot 11e which stops and holds the thread 7 at the tip, the thing in which 11 f of holes held through the thread 7 near the tip were formed, etc., as passage means 11 other than the above, as shown in drawing 4.

[0037]When the passage means 11 like the above is used, it is possible to use selectively the receiving means 31 which has the rod-like structure 8 or elasticity in which the hooking part 8a in the 1st example was formed as the receiving means 3.

[0038]Next, the threader implement A which starts the 3rd example by drawing 5 is explained.

[0039]The passage means is constituted in this example by the length set up beforehand and the cylindrical style 12 which has thickness, The blind hole which spherical or is not illustrated in the former end face 12b which it is formed in the shape of \*\*, and is a rear end face is formed so that the tip 12a may pass easily between a living body's organizations or an in-house. And by inserting the end of the thread 7 in said blind hole, and closing the circumference of this blind hole, the thread 7 is held at the style 12. It is preferred to use the atraumatic needle 12 mentioned later as said style 12.

[0040]The fitting part 2a which attaches the style 12 removable is formed at the tip of the carrying member



2 of the threader implement A. The fitting part 2a has the function to hold the attached style 12 temporarily. That is, the style 12 fits into the receiving means 32 with grasping operation of the carrying member 2 and the attachment component 4.

Then, in connection with the opening operation of each of said members 2 and 4, the style 12 secedes from the fitting part 2a, and is received by the receiving means 32.

[0041]the fitting part 2a which holds the style 12 temporarily is shown in drawing 6 — as — the prescribed position by the side of the tip of the carrying member 2 — the outer diameter of the style 12, and abbreviation — the crevice 2a with an equal path is formed, and this crevice 2a and a tip are connected with slit 2b, and it is constituted.

[0042]Therefore, the thread 7 attached beforehand is inserted in via slit 2b, and it is possible to attach the style 12 to the carrying member 2 by making the former end face 12b side of the style 12 fit into the crevice 2a which is the fitting part 2a. The style 12 attached in this way holds the state where it fitted into the crevice 2a, and it does not secede from it simply.

[0043]The resistance which generates the style 12 when passing between organizations or an in-house is transmitted to the carrying member 2 via the contact surface of the former end face 12b of the style 12, and the crevice 2a. Therefore, when the style 12 passes through an organization, it does not secede from the carrying member 2 by pass resistance, or it does not fall.

[0044]The receiving means 32 presses and holds the periphery of this style 12, when the style 12 fits in with grasping operation of the threader implement A, By maintaining the pressing state over the style 12 and making it secede from the crevice 2a, when the carrying member 2 and the attachment component 4 are isolated in connection with the opening operation of the threader implement A, the thread 7 is received substantially.

[0045]for this reason — the center of the receiving means 32 — the outer diameter of the style 12, and abbreviation — it is equal, or the hole 32a with a slightly small path is formed, and the slideway 32b for showing this style 12 to the hole 32a is formed in the style 12 and the field which counters.

[0046]Next, drawing 7 explains like the above the case where the blood vessel E is ligated using the threader implement A which attached the style 12 and the receiving means 32.

[0047]As shown in the figure (a), it inserts in the inner part of the blood vessel E which should be ligated in the state which opened the threader implement A wide, i.e., the state where the style 12 and the receiving means 32 were made to isolate.

Then, the style 12 is made to fit into the receiving means 32, as grasping operation of the handle 6 is carried out and it is shown in the figure (b).

At this time, the style 12 is pressed by the receiving means 32 and held.

[0048]Subsequently, the style 12 secedes from the crevice 2a, and is held at the receiving means 32, and the thread 7 turns around the surroundings of the blood vessel E, and it means that it had been substantially received by the receiving means 32 via the style 12 as by carrying out opening operation of the threader implement A showed to the figure (c). In connection with the drawer to the outside of the body of the threader implement A, as shown in the figure (d), the thread 7 is also pulled out by the outside of the body. And after pulling out the threader implement A outside of the body, it is possible to make this thread 7 and the style 12 secede from the receiving means 32 by pulling the thread 7.

[0049]It is possible like the above to adjust the holding power of the style 12 by the receiving means 32 by setting up the diameter and length of the hole 32a suitably in the style 12 and the receiving means 32 which were constituted. However, when making the style 12 secede from the receiving means 32, there is a possibility that comparatively big power may be required.

[0050]Next, the composition of the threader implement A which starts the 4th example by drawing 8 is explained.

[0051]The threader implement A concerning this example attaches to the carrying member 2 the style 13 which formed the spherule 13a at the tip removable, and it is a figure explaining the important section of the threader implement A which attached the receiving means 33 in which the spherical part 33a which accepts said spherule 13a was formed at the tip of the attachment component 4. It makes it possible to make the style 13 by which press holding was carried out to the receiving means 33 secede from this threader implement A easily by small power.

[0052]The spherule 13a with a larger path than the thickness of the style 13 is formed at the tip of the style 13, and the composition of those other than this spherule 13a is constituted like the style 12 mentioned above.

[0053]The spherical part 33a which accepts the spherule 13a is formed in the style 13 and opposite hand of the receiving means 33, and the slideway 33b which shows the spherule 13a to the spherical part 33a is formed in the style 13 and the field which counters. The hole 33c which connected the slideway 33b with the spherical part 33a, and had a slightly larger and path smaller than the path of the spherule 13a than the thickness of the style 13 is formed. Therefore, 33 d of projections are formed in accordance with the circumference of the hole 33c.

[0054]In the above-mentioned composition, the style 13 approaches the receiving means 33 with grasping operation of the threader implement A, and the spherule 13a fits into the spherical part 33a through the hole 33c. And if opening operation of the threader implement A is carried out, the carrying member 2 and the attachment component 4 are isolated with this operation, and the style 13 will secede from the crevice 2a, and will be held at the spherical part 33a of the receiving means 33.

[0055]If the thread 7 is pulled as it becomes parallel to the attachment component 4 as shown in drawing 8 (b) when pulling out the threader implement A outside of the body and making the style 13 secede from the receiving means 33, the base 13b of the spherule 13a will engage with 33 d of projections, and the style 13 will be rotated by making this engagement part into a fulcrum. With said rotation, the style 13 secedes from the receiving means 33 because the fulcrum and opposite hand of the spherical part 13a overcome 33 d of projections.

[0056]It is possible to make it very smaller than the power at the time of making the style 12 which mentioned above the power taken to apply the principle of a lever when making the style 13 secede from the receiving means 33 like the above to make the style 13 break away secede from the receiving means 32.

[0057]When ligating using the styles 12 and 13, whenever it carries out one ligation, it will be necessary for the threader implement A to attach the styles 12 and 13, and will lay on the shelf of the styles 12 and 13 for every one ligation.

[0058]Next, the composition of the threader implement A which starts the 5th example by drawing 9 is explained.

[0059]The position through implement A shown in a figure inserts in and holds the thread 7 to the shaft orientations of the style 14 attached to the carrying member 2, Make the style 14 fit into the receiving means 34 with grasping operation of the threader implement A, the style 14 is made to secede from the receiving means 34 in connection with the opening operation of the threader implement A, and it is a figure explaining the important section of the threader implement A constituted so that the thread 7 might be received by the receiving means 34.

[0060]The style 14 inserts in the thread 7 which has the larger diameter parts 7a, such as incidental looping which tied and formed the thread 7 in part, the conclusion ball or a ball which applied adhesives and was solidified, and a ball formed by fixing to thread the ball of the metal containing stainless steel, along shaft orientations, and. Stop and hold said larger diameter part 7a at a tip, and with grasping operation of the threader implement A, with the thread 7, pass between a living body's organizations or through under an organization, and it fits into the receiving means 34, And it is constituted so that it may be possible to receive the thread 7 by the receiving means 34, when seceding from the receiving means 34 in connection with the opening operation of the threader implement A.

[0061]In order to insert in the thread 7, the slit 14a with the size according to the thickness of this thread 7 is formed in the style 14 covering the overall length. The slit 14a is formed so that a pars basilaris ossis occipitalis may reach the center of the style 14, and in order to hold the larger diameter part 7a of the thread 7, the attaching part 14b of sphere form is formed at the tip of the style 14. The style 14 is attached to the fitting part 2a formed in the carrying member 2 removable.

[0062]The fitting part 2a which consists of the hole 2a with a path slightly smaller than the outer diameter of the style 14 as shown, for example in drawing 10 is formed at the tip of the carrying member 2. This hole 2a is wide opened with slit 2b at the tip side of the carrying member 2, and it is possible to insert the thread 7 in the slit 14a of the style 14 via slit 2b.

[0063]The oblong hole 2c where width is comparatively large is formed in the opposite hand of slit 2b of the

hole 2a, this oblong hole 2c and hole 2a are connected, and the slit 2d is formed. That is, the two sandwiching pieces 2e in which the tip of the carrying member 2 had spring nature with the oblong hole 2c, the hole 2a, the slit 2d, and 2b are formed.

[0064]In the above-mentioned composition, since the hole 2a has a path smaller than the outer diameter of the style 14, when the style 14 is attached to the hole 2a, the style 14 is pressed with the sandwiching piece 2e, and is held firmly. The holding power over the style 14 by the sandwiching piece 2e can be set as a desired value by setting up suitably the ratio of the outer diameter of this style 14, and the path of the hole 2a, the length of the oblong hole 2c, etc. Therefore, when the style 14 passes between organizations or through under an organization, it does not secede from the hole 2a.

[0065]The hole 34a into which the tip end part of the style 14 is made to fit is formed in the center of the receiving means 34, and the slideway 34b which shows the hole 34a to the tip of this style 14 is formed in the style 14 and the field which counters. The crevice 34c is formed in the opposite hand of the receiving means 34.

[0066]The above-mentioned hole 34a is formed with the very small size (pinhole) so that it may be possible to press and receive the larger diameter part 7a of the thread 7. The portion into which the tip of the style 14 is made to fit does not necessarily need to be the hole 34a, and the piece cut deeply and formed in the shape of a single character, the shape of triradius, and cross shape from the slideway 34b of the receiving means 34 to the crevice 34c may constitute it.

[0067]When the style 14 fits into the receiving means 34, the thrust to the style 14 by the receiving means 34 needs to be smaller than the holding power of the style 14 by the sandwiching piece 2e of the carrying member 2. The thrust to the style 14 of the receiving means 34 can be adjusted with the depth of the material which constitutes the receiving means 34, and the crevice 34c. Therefore, the receiving means 34 is designed in consideration of said conditions.

[0068]In the above-mentioned composition, if the style 14 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the tip which the style 14 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 34. Subsequently, if opening operation of the threader implement A is carried out, the style 14 will secede from the receiving means 34 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the hole 34a of the receiving means 34. And it is possible to make it secede from the receiving means 34 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0069]When the above-mentioned style 14 is used, it is required to insert the thread 7 in the style 14 for every one ligation, but the style 14 can be used continuously. For this reason, when there are many ligation parts, what is necessary will be to exchange only the thread 7, and it is advantageous from a cost side.

[0070]Even if it is a case where such a style 14 is used, there is a possibility that an opening may be formed between the style 14 and the hole 2a which is the fitting parts 2a. For this reason, as for the style 14, since a possibility that said opening cannot be sterilized thoroughly arises when carrying out postoperative sterilization treatment, it is preferred to lay on the shelf for every one operation.

[0071]Drawing 11 is a figure explaining the important section of the threader implement A adapting the structure shown in the 5th above-mentioned example.

[0072]The slot 15a holding the thread 7 which has the larger diameter part 7a is formed at the tip of the style 15, and the slit 15b which shows the thread 7 to the operating person side along with the carrying member 2 is formed in the back end. This needlelike end 15 is attached to the fitting part 2a which consists of the hole 2a formed at the tip of the carrying member 2 like the style 14 mentioned above removable.

[0073]The slit 35a into which the slot 15a formed at the tip of the style 15 is made to fit is formed in the center of the receiving means 35, and the slideway 35b which shows the slit 35a to the tip of this style 15 is formed in the style 15 and the field which counters. The crevice 35c is formed in the opposite hand of the receiving means 35.

[0074]In the above-mentioned composition, if the style 15 is attached to the fitting part 2a of the carrying member 2, and the thread 7 in which the larger diameter part 7a was formed is inserted in and grasping operation of the threader implement A is carried out, the slot 15a which the style 15 passed between organizations or an in-house, and stopped the larger diameter part 7a will fit into the receiving means 35.

Subsequently, if opening operation of the threader implement A is carried out, the style 15 will secede from the receiving means 35 with this operation, and press holding of the larger diameter part 7a of the thread 7 will be simultaneously carried out to the slit 35a of the receiving means 35. And it is possible to make it secede from the receiving means 35 by pulling out the threader implement A outside of the body, and pulling the thread 7.

[0075]Next, drawing 12 explains the case where metal with spring nature constitutes the receiving means 3.

[0076]The metal plate which the receiving means 36 shown in the figure (a) had spring nature, or can demonstrate spring nature by heat treatment, For example, thickness abbreviation which consists of stainless steel Press forming of the 0.1-mm board is carried out, it is constituted, and it assumes receiving the style 12 with which it was equipped removable to the carrying member 2 as the passage means 1.

[0077]The flange 36a which was formed in the side which counters the receiving means 36 with the passage means 1 of the hole 4a of the attachment component 4 and which becomes depressed and fits into 4b, When the tip end part of the style 12 fits in, two or more slits 36c formed in the funnel shape receipt part 36b which presses this fitting part, and the receipt part 36b are formed, respectively.

[0078]The above-mentioned slit 36c is formed considering 36 d of skirts of the receipt part 36b as the starting point. For this reason, when the tip end part of the style 11 fits into the receipt part 36b, a possibility that 36 d of skirts may be expanded and thrust large enough cannot be acted arises. In order to solve this problem, the O ring shape member 36e which prevents 36 d of skirts of the receipt part 36b from being expanded is formed in the back side of the receipt part 36b.

[0079]When the tip end part of the style 11 fits into the receipt part 36b in the receiving means 36 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 36b. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 36, and secedes from the fitting part 2a of the carrying member 2.

[0080]The receiving means 37 shown in the figure (b) is constituted supposing receiving the style 12 like the above-mentioned receiving means 36. This receiving means 37 is formed by machining, for example, engine-lathe processing.

[0081]The flange 37a and the boss 37b are formed in the receiving means 37, and the boss 37b is in the hole 4a, abbreviation, etc. which were formed in the attachment component 4 by carrying out, and has a size. The hard drum-like receipt part 37c is formed succeeding the boss 37b, and 37 d of skirts of this receipt part 37c have a slightly larger size than the hole 4a. The tapered shape slideway 37e which is missing from the boss 37b from the flange 37a, and shows the tip of the style 12 in the direction of the receipt part 37c is formed, and two or more slits 37f are further formed in the receipt part 37c.

[0082]Therefore, it is possible to give spring nature to the receipt part 37c because 37 d of skirts are regulated by the hole 4a and transform the receiving means 37, when it fits into the hole 4a.

[0083]When the tip end part of the style 11 fits into the receipt part 37c in the receiving means 37 constituted like the above, it is possible to hold by making thrust act on the portion which fitted in by the receipt part 37c. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0084]Next, drawing 13 explains the composition of further others of the receiving means 3.

[0085]The receiving means 38 shown in a figure is constituted so that it may be possible to collaborate with the hole 4a formed in the attachment component 4, and to receive the style 12, and thrust may be made to act on the style 12 which fitted into the hole 4a with the flat spring 38 built into the attachment component 4.

[0086]The metal plate in which the flat spring 38 had spring nature, for example, thickness abbreviation which consists of stainless steel, A 0.3-mm board is processed and it is constituted. It is constituted by the flat spring 38 by the press piece 38a which attends the hole 4a of the attachment component 4, and presses the style 12, and the suspension arm 38b provided in the prescribed position of the press piece 38a.

[0087]Near the hole 4a formed in the attachment component 4, the hollow 4c incorporating the flat spring 38 is formed.

The suspending portion 4d which stops the suspension arm 38b of the flat spring 38 is formed in the prescribed position of this hollow 4c.

The tapered shape slideway 4e is formed in the side which counters the style 12 of the hole 4a.

[0088]It is possible like the above to hold by the press piece 38a of the flat spring 38 giving thrust to the style 12 which fitted into the hole 4a in the constituted receiving means 38, and making the style 12 weld by pressure to the hole 4a. And with isolation of the carrying member 2 and the attachment component 4, the style 12 maintains the state where it was held at the receiving means 37, and secedes from the fitting part 2a of the carrying member 2.

[0089]In the above-mentioned composition, it is preferred to provide the slot which engages with the press piece 38a of the flat spring 38 for the purpose of receiving the style 12 more certainly at the style 12. In this case, form the flat spring 38 in lever shape with a long overall length, and a pin is formed in the attachment component 4. Because energize so that a pin may be equipped with the flat spring 38 rotatable and the press piece 38a may always project inside the hole 4a, and make the end side of another side project from an attachment component and an operating person pushes this lobe. The press piece 38a is evacuated from the hole 4a, and it may constitute so that the style 12 may be made to secede from the hole 4a.

[0090]Next, drawing 14 explains the atraumatic needle which constitutes the style 12. The same numerals are given to the portion which has the style 12, identical parts, or the same function in the example of the following atraumatic needles.

[0091]The atraumatic needle 12 is formed in shape, such as spherical or the shape of \*\*, corresponding to the organization with predetermined length which should pass so that it may be formed direct needlelike and the tip 12a can run through between organizations or with an in-house smoothly. The thread 7 is installed in the shaft orientations of the atraumatic needle 12 from the former end face 12b. That is, a blind hole or a slot with the size corresponding to the specification of the thread 7 is formed in the former end face 12b of the atraumatic needle 12, and it is constituted so that the end of the thread 7 is inserted in this blind hole and a slot, it may caulking(refer to the figure (a) )-\*\*, or it may paste up (refer to the Drawing (b) and (c)) and the portion corresponding to a blind hole can be held. It is also possible to constitute the atraumatic needle 12 which carries out integral moulding of the thread 7 with insert molding method, and consists of synthetic resins so that it may mention later.

[0092]The sectional shape in particular of the drum section 12c of the atraumatic needle 12 is not limited. That is, since this atraumatic needle 12 is not grasped by the needle holder when undergoing an operation, it does not need to be the shape where grasping by the needle holder was assumed.

[0093]The former end 12d of the atraumatic needle 12 is temporarily held in the state where it fitted into the fitting part 2a formed in the carrying member 2. for this reason, the portion corresponding to [ are a portion which fits into the fitting part 2a at least, and ] the pars basilaris ossis occipitalis and edge of this fitting part 2a — the fitting part 2a and abbreviation — it is equal or it is required to be a slightly small size.

[0094]That is, as shown in the figure (a), when the slot 12e formed of the caulking is in agreement with the opening edge of the fitting part 2a, it is difficult to make the atraumatic needle 12 hold to the fitting part 2a in the state where it was stabilized.

[0095]When the fitting part 2a of the carrying member 2 is equipped with the atraumatic needle 12, the driving force with which the former end face 12b acts on the carrying member 2 in contact with the pars basilaris ossis occipitalis of the fitting part 2a is transmitted. For this reason, it is required for the former end face 12b holding the thread 7 to have this thread 7 and a clear level difference.

[0096]The thickness of the thread 7 used when litigating a blood vessel is abbreviation. The thickness of the thread 7 which is 0.3 mm – about 0.4 mm, and is used when suturing an incision part is abbreviation. They are 0.2 mm – about 0.3 mm. When performing ligation or a suture, power required to pass between organizations or an in-house for the atraumatic needle 12 is about abbreviation 50g– 200g. When receiving the power of said extent in the former end face 12b, it is abbreviation to the circumference of the thread 7. The level difference (exposed surface of the former end face 12b) of about 0.1 mm should just be formed. For this reason, the thickness of the atraumatic needle 12 is set as about 0.8 mm – about 1 mm.

[0097]When equipping with the atraumatic needle 12 the threader implement A shown in drawing 1 and performing ligation or a suture, the tip 12a of the atraumatic needle 12 performs rotating motion according

to the distance from the axis 5 to the fitting part 2a, and fits into the receiving means 3. For this reason, when the length of the atraumatic needle 12 is long, and the tip 12a fits into the receiving means 3, there is a possibility that the power of the direction which intersects the major axis of the atraumatic needle 12 may act, and smooth fitting cannot be made. For this reason, the overall length of the atraumatic needle 12 is set as the range of 3 mm – about 10 mm.

[0098]When using for the threader implement A which has the receiving means 3 constituted with the flat spring 38 in the atraumatic needle 12 as shown in drawing 13, 12 f of slots are formed in the position which carried out prescribed distance over the perimeter from the tip 12a of the atraumatic needle 12. 12 f of slots are because the press piece 38a of the flat spring 38 is engaged, by forming 12 f of this slot, can hold certainly the atraumatic needle 12 which fitted into the hole 4a of the attachment component 4, and can receive it.

[0099]Distance from the tip 12a to 12f of slots is not limited. However, as for 12 f of slots, it is preferred to be formed in the portion 12c which the portion linked to the both sides of 12 f of these slots is parallel, and is in the path of the hole 4a, abbreviation, etc. by carrying out, and has a size, for example, a drum section. In this case, it is not shaky, when the atraumatic needle 12 fits into the hole 4a and is held with the flat spring 38.

[0100]It is preferred to use SUS303 (stainless steel) or BSBM (free cutting brass) with a comparatively cheap price as a material at the time of constituting the atraumatic needle 12. It is possible by using such a material to reduce the cost of the atraumatic needle 12.

[0101]It is also possible to carry out the fabricating operation of the synthetic resin material, and to constitute the atraumatic needle 12. In this case, it is preferred to make it unify simultaneously with shaping of the atraumatic needle 12, and to install the thread 7 in the shaft orientations of the atraumatic needle 12 from the former end face 12b with insert molding method. The atraumatic needle 12 manufactured by this method can supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is possible to carry out discarding treatment of the atraumatic needle 12 after use easily.

[0102]Next, other composition of the attachment component 4 which attaches the carrying member 2 which attaches the passage means 1, and the receiving means 3 is explained.

[0103]Drawing 15 is a figure explaining the composition of the threader implement B which gave spring nature and connected the carrying member 2 and the attachment component 4. This threader implement B is constituted so that an operating person may be able to operate it at the same feel as tweezers.

[0104]The tip end part (left-hand side of drawing 15) of the carrying member 2 and the attachment component 4 is formed with moderate rigidity, and spring nature is given to a former portion (right-hand side of drawing 15), and the threader implement B is joined mutually. Even if it is the threader implement B constituted in this way, like each example mentioned above, make the passage means 11 unite with the carrying member 2, or the styles 12–14 are attached removable, and it is possible to attach the receiving means 31–38 to the attachment component 4, and to perform ligation of a blood vessel and the suture of an incision part.

[0105]Drawing 16 is a figure explaining the composition of the threader implement C which formed the tip of the carrying member 2 circularly. In the figure, the carrying member 2 and the attachment component 4 are attached to the axis 5 like the threader implement A, and are constituted rotatable mutually.

[0106]As for the attachment side of the passage means 1 in the carrying member 2, the linear shape straight part 2f which has the length beforehand set up from the axis 5 is formed, and the arc part 2g which makes said length a radius is formed in the tip side which is this straight part 2f. And the passage means 1 is attached at the tip of the arc part 2g. The attachment side of the receiving means 3 in the attachment component 4 is installed by linear shape from the axis 5, and the receiving means 3 is attached to the length of the straight part 2f of the carrying member 2, and a corresponding position.

[0107]Like the above, in connection with the switching operation of the handle 6, the passage means 1 will move and carries out disjunction of the same circumference top to an abbreviated straight-line target in the constituted threader implement C to the receiving means 3 arranged on this circumference. For this reason, it becomes possible more correctly and to ensure receipt operation of the thread 7 by the receiving means 3.

[0108]That is, when the passage means 1 are the styles 12 and 13 attached to the carrying member 2

removable, in order that the styles 12 and 13 may fit in linearly to the receiving means 3 in connection with the switching operation of the threader implement C, power which becomes complicated to the styles 12 and 13 does not act. For this reason, it is possible to make the styles 12 and 13 fit into the receiving means 3 certainly.

[0109]Drawing 17 is a figure explaining the composition of the threader implement D which made it possible to perform the ligation and the suture in a very deep position, for example, the operation in the laparoscope. in the figure, the carrying member 2 and the attachment component 4 are arranged at the tip side of the casing 41 with predetermined length (responding to the part which should be ligated — abbreviation [ ] — 300 mm – 400 mm), and at least one members 2 and 4 are constituted so that disjunction can be carried out to the member of another side. In this example, the attachment component 4 is adhered at the tip of the casing 41, and it has attached to the axis which does not illustrate the carrying member 2 rotatable.

[0110]The casing 41 is attached to the operating grip 42 which formed the trigger 43, and the trigger 43 and the carrying member 2 are connected via conduction members which have been arranged inside the casing 41 and which are not illustrated, such as a wire or a rod. To constitute so that disjunction of the carrying member 2 and the attachment component 4 of each other can be carried out, it is required to connect the trigger 43, the carrying member 2, and the attachment component 4 by a conduction member.

[0111]Therefore, when an operating person operates the trigger 43, this operating physical force is transmitted to the carrying member 2 via a conduction member, and the thread 7 with which each member 2 approached the attachment component 4, and was held at the passage means 1 is received by the receiving means 3.

[0112]Like the above, it is preferred to form the casing 41 in the constituted threader implement E using the material which has flexibility, and it is desirable to form to such an extent that thickness can be inserted in an endoscope. By constituting the threader implement E from said conditions, it is possible to perform easily the ligation and the suture in the operation in the laparoscope carried out an endoscope supervising.

[0113]When ligating especially in the case of the operation in the laparoscope, what is called a medical-application clip is used now in many cases. However, when using a clip, there are problems, such as a point that shape is large, a point with a possibility that a clip may separate from a ligation part, and a point that a blood vessel must be made to exfoliate from the surrounding organization, but it becomes possible by using the above-mentioned threader implement E to avoid said each problem.

[0114]Although it is possible in each above-mentioned threader implement A–E to form each members forming with metallic materials, such as stainless steel, constituting with the mold goods of a synthetic resin is also possible. For example, when threader implement A–E is constituted from fabricating and assembling the carrying member 2, the attachment component 4, and the member of axis 5 grade with a synthetic resin, it is possible to supply a medical practitioner, where sterilization treatment is carried out beforehand, and it is also possible to carry out discarding treatment of threader implement A–E after use easily.

[0115]

[Effect of the Invention]In the threader implement which starts this invention as explained to details above. It is possible to turn and ligate thread around a blood vessel by operation of the single step of opening and closing a threader implement, or to suture an incision part, and after ending said operation, thread can be pulled out outside of the body by pulling out a threader implement outside of the body. For this reason, ligation operation and suturing operation can be performed certainly easily and promptly.

[Brief Description of the Drawings]

[Drawing 1]It is a side view explaining the entire configuration of the threader implement constituted so that a carrying member and an attachment component might be rotated focusing on an axis and disjunction of a passage means and the receiving means might be carried out.

[Drawing 2]It is a figure explaining the important section of the threader implement concerning the 1st example constituted so that thread might be hooked and received.

[Drawing 3]It is a figure explaining the composition of the passage means and receiving means concerning the 2nd example.

[Drawing 4]It is a figure explaining other composition of a passage means.

[Drawing 5]It is a figure explaining the important section of the threader implement concerning the 3rd example that constituted the passage means removable to the carrying member.

[Drawing 6]It is a figure explaining the important section of the carrying member which attaches a passage means removable.

[Drawing 7]It is a figure explaining a ligation operational sequence.

[Drawing 8]It is a figure explaining the important section of the threader implement concerning the 4th example that constituted the passage means removable to the carrying member.

[Drawing 9]It is a figure explaining the important section of the threader implement concerning the 5th example that constituted the passage means removable to the carrying member.

[Drawing 10]It is a figure explaining the important section of the carrying member which attaches a passage means removable.

[Drawing 11]It is a figure explaining the application of the 5th example.

[Drawing 12]It is a figure explaining other examples of composition of a receiving means.

[Drawing 13]It is a figure explaining the example of composition of further others of a receiving means.

[Drawing 14]It is a figure explaining the composition of an atraumatic needle.

[Drawing 15]It is a side view explaining the entire configuration of the threader implement which gave spring nature and connected the carrying member and the attachment component.

[Drawing 16]It is a side view explaining the entire configuration of the threader implement which formed the tip end part of the carrying member circularly.

[Drawing 17]It is a side view explaining the entire configuration of the threader implement which made it possible to litigate a deep part easily or to suture.

[Description of Notations]

A-D threader implement

1 and 11 Passage means

11c Slit

11d and 11e Slot

11 f Hole

12 A style, an atraumatic needle

12a Tip

12b Former end face

12c Drum section

12 d Former end

12e Slot

12 f Slot

13-15 Style

13a Spherule

14a and 15a Slit

2 Carrying member

2a A fitting part, a crevice, a hole

2e Sandwiching piece

2 f Straight part

2 g Arc part

3, 31-38 Receiving means

31a Slit

32a Hole

33a Spherical part

4 Attachment component

4a Hole

5 Axis

6 Handle

7 Thread

7a Larger diameter part

41 Casing



42 Grip  
43 Trigger

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[Translation done.]